NOACA
Research Brief

Major Employment Hubs in the Cleveland MSA

December 2016

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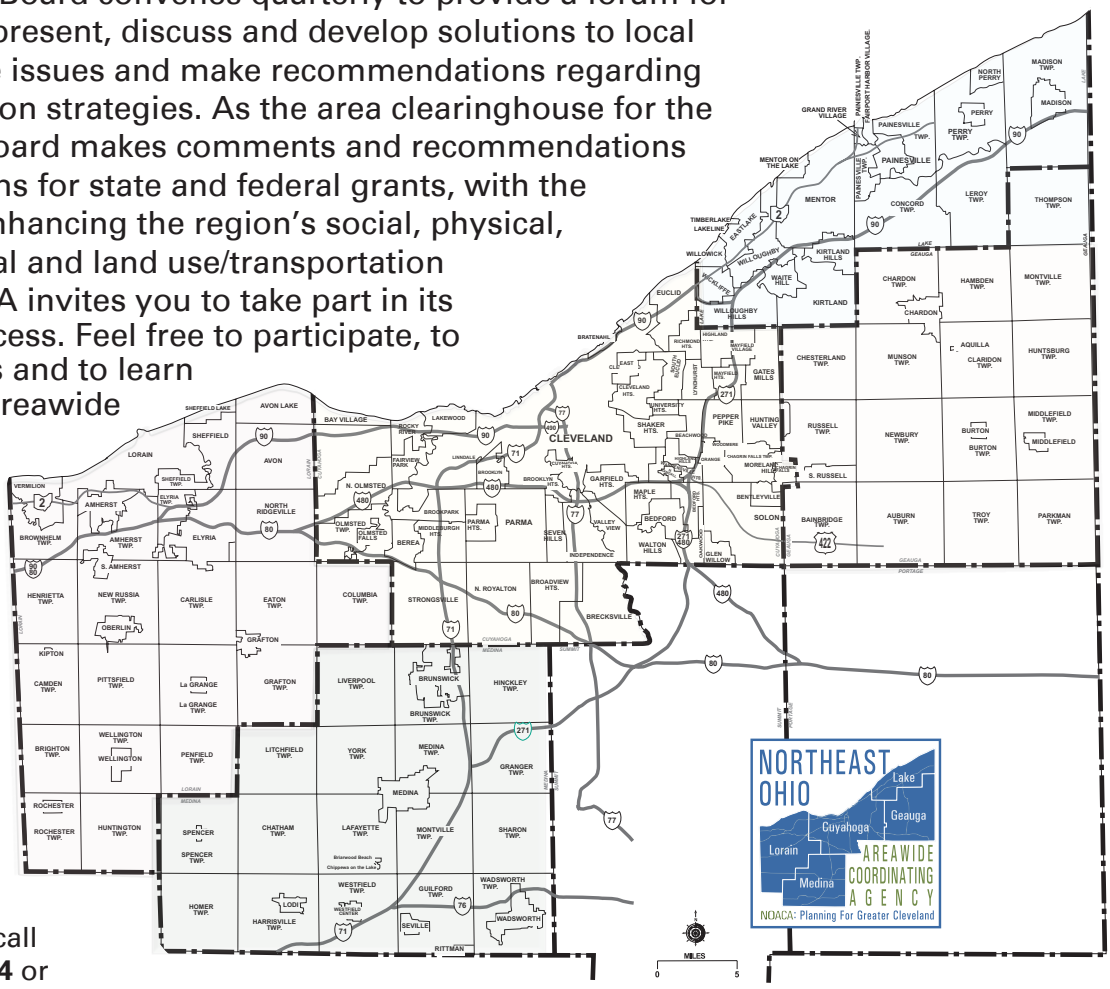
- Serve as the Metropolitan Planning Organization (MPO), with responsibility for comprehensive, cooperative and continuous planning for highways, public transit, and bikeways, as defined in the current transportation law.
- Perform continuous water quality, transportation-related air quality and other environmental planning functions.
- Administer the area clearinghouse function, which includes providing local government with the opportunity to review a wide variety of local or state applications for federal funds.
- Conduct transportation and environmental planning and related demographic, economic and land use research.
- Serve as an information center for transportation and environmental and related planning.
- At NOACA Board of Director direction, provide transportation and environmental planning assistance to the 172 units of local, general purpose government.

NOACA's Board of Directors is composed of 45 local public officials. The Board convenes quarterly to provide a forum for members to present, discuss and develop solutions to local and areawide issues and make recommendations regarding implementation strategies. As the area clearinghouse for the region, the Board makes comments and recommendations on applications for state and federal grants, with the purpose of enhancing the region's social, physical, environmental and land use/transportation fabric. NOACA invites you to take part in its planning process. Feel free to participate, to ask questions and to learn more about areawide planning.



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11) Supplementary Notes Federal funding for this project was provided by the Federal Highway Administration and administered by the Ohio Department of Transportation.	
12) Abstract There are six main hubs of employment in the five-county NOACA region. Each hub has at least 10,000 jobs, equivalent to roughly 1% of the Cleveland MSA's total employment of approximately one million jobs. The six hubs equal only 24% of the region's employment, indicating that job sprawl is extensive. Moreover, the residential location of workers for each job hub is also widely distributed throughout the region. While the largest hub, Downtown/Near East Side, has lost employment between 2004 and 2014, the area around University Circle has been growing steadily and is the fastest-growing employment hub in the region.	
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Executive Summary

There are six main hubs of employment in the five-county NOACA region, with the largest being Downtown/Near East Side with approximately 110,000 jobs in 2014.[1] These hubs are illustrated in Figure 1. Though it is the largest hub in the region, Downtown/Near East Side has witnessed a 14.5% employment decrease between 2004 and 2014; meanwhile, the second-largest hub, University Circle (including, for this analysis, Midtown between E. 105 St. and E. 83 St.), has increased 46% in the same period to 55,000 jobs.[2] Of this employment in University Circle, 90% are in two industry sectors, Educational Services and Health Care & Social Assistance. Given the tremendous growth of jobs in this hub and the proportion of them in, to use the popular term, "eds and meds," it is critical to support and nurture this growth by including support through the transportation system.

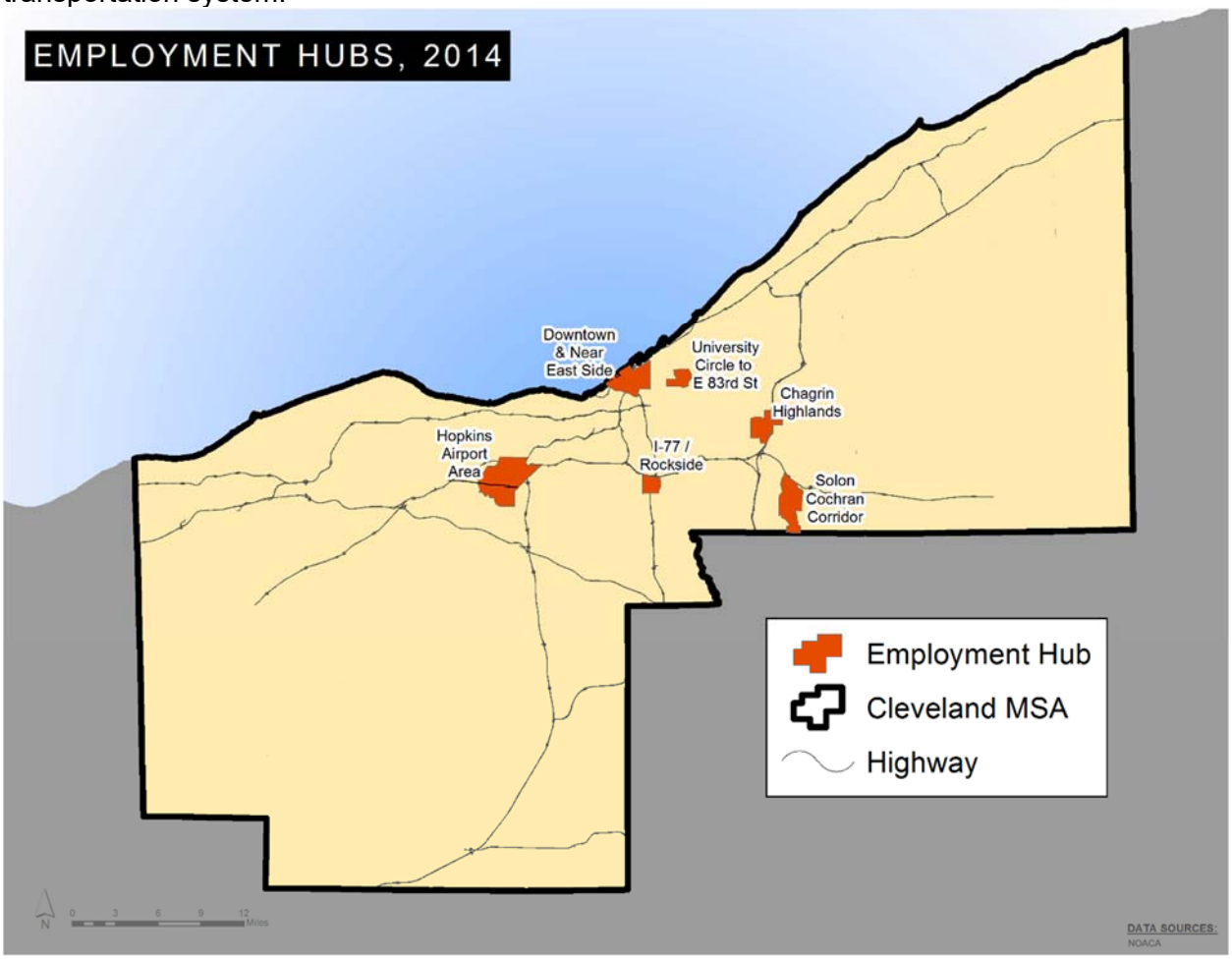


Figure 1. Location of the six employment hubs in the Cleveland Metropolitan Statistical Area (MSA).

[1]The NOACA counties and the Cleveland Metropolitan Statistical Area (MSA) are the same geography, composed of Cuyahoga, Lorain, Medina, Geauga, and Lake counties. Self-employed persons and U.S. postal workers are excluded from the data, while city and county workers outside Downtown Cleveland may have been have been included in the Downtown numbers (yet unverified given data confidentiality issues, but there were known inaccuracies in the past).

[2]As with employees of the City of Cleveland and Cuyahoga County potentially being counted in Downtown Cleveland rather than at their exact locations, this pattern may also be true with some Cleveland Clinic and University Hospitals employees who work at local neighborhood facilities (not hospitals) but are instead counted as being at the main campuses.

Employment in Downtown/Near East Side is more diverse, as the two largest industry sectors, "Professional, Scientific, and Technical Services" and "Public Administration," together make up only 29% of Downtown/Near East Side employment. In addition to Downtown/Near East Side, only one other hub, Hopkins Airport Area, lost employment between 2004 and 2014. This area witnessed a 16% loss in hub employment, led by the loss of 2,100 manufacturing jobs. (Impacts from United Airline's 2014 dehubbing of Hopkins Airport can be assessed once 2015 data are released.) The remaining three hubs, Solon Cochran Corridor, I-77 & Rockside, and Chagrin Highlands, experienced employment growth at 28%, 16%, and 13%, respectively, while the five-county Metropolitan Statistical Area (MSA) lost 3.3% over the same period. (The current composition of each hub by industry sector can be found in Section 3 of this Research Brief.)

Despite the agglomeration of jobs in the hubs, however, employment in the NOACA region overall is not geographically concentrated. The employment in the hubs represents only 24% of all jobs in the Cleveland MSA. While this is 1.4% higher than in 2004, the overwhelming majority of jobs—76%—are outside the six employment hubs. Three data points are particularly noteworthy:

- Comparing 2004 and 2014, hub employment, excluding federal employees and self-employed persons, increased by 5,400 jobs (2.3%) while metropolitan employment, excluding the six hubs, lost 39,000 jobs (-4.9%). During this time Downtown/Near East Side lost 18,000 jobs (-14.5%), indicating the strengths, in general, of the other hubs.

- Hub employment, as a percentage of regional employment, increased from 22.6% in 2004 to 24.7% in 2009 before dropping slightly to 24.0% in 2014.

- Using a location quotient (LQ) analysis to identify local strengths and opportunities of the hubs compared to the region, and thus industry clusters and points of strengths and opportunities within the region, 11 sectors were found where proportional employment was greater in the hubs than in the region, including three sectors, "Management of Companies and Enterprises"; "Professional, Scientific and Technical Services"; and "Arts, Entertainment and Recreation," whose proportions of employment was almost double that of the region as a whole.

While further study would be required before a conclusive statement can be made, the data may suggest that there is greater employment resiliency for jobs within employment agglomerations during times of economic hardship. Moreover, the theory that agglomeration of employment fosters further growth is validated here, as the hubs, notwithstanding global manufacturing trends, in general grew while regional employment shrank.

With 96,139 jobs, Downtown accounts for only 9.6% of all employment in the region, despite being the region's economic center. This figure is a subset of the Downtown/Near East Side geography presented in this study, which encompasses 109,589 jobs. A 1985 study by the Greater Cleveland Growth Association, which used similar boundaries for Downtown, indicated 130,534 jobs in 1980. This supports the recent trend of Downtown's and Downtown/Near East Side's losses between 2004 and 2014 and highlights the need for corrective action.

Of particular concern for transportation purposes is job density. Of the six hubs, the University Circle hub (including Midtown to E. 83 Street) has the greatest density at 35,328 jobs per square mile. Second is Downtown/Near East Side, at 22,050 jobs per square mile. Meanwhile, the Hopkins Airport Area hub, with a higher proportion of manufacturing jobs, had the lowest job density, as manufacturing generally requires more area per worker than the service and medical sectors. Also, nearly three square miles of the Hopkins Airport Area is the airport's airfield.

Examining the profile of workers in each hub supports understanding of potential transportation-related requirements for each hub. For example, lower-wage workers are generally more transit dependent than those with higher incomes. The hub with the greatest proportion of workers earning $1,250 per month or less were reported at the I-77 & Rockside Area hub, though this may be the result of temporary work agencies based there, while the actual work is performed elsewhere. Conversely, four of the six hubs—Downtown, University Circle, Solon Cochran Corridor, and Hopkins Airport Area—had more than 50% of its workers in the highest income category of earning more than $3,333 per month.

Also interesting to note is that for every male worker in University Circle, there are two female workers. In the Hopkins Airport Area hub, where the top two sectors are “Transportation & Warehousing” and “Manufacturing,” this gender imbalance is reversed, with 68% being male and 32% female. In terms of educational attainment, the largest category for Downtown/Near East Side, University Circle to E. 83 St., and Chagrin Highlands was “Bachelor’s degree or advanced degree.” For the remaining hubs, “Some college or Associate degree” was the largest category.

In terms of commuting for work, one of every four Downtown/Near East Side employees lives in either Cleveland or Parma, while one of every four University Circle employees lives in either Cleveland, Cleveland Heights, or Shaker Heights. The residential distribution is very high for employees of the six hubs: the top 25 communities of residence for each of the six hubs represents roughly only half of all employees in each hub. As a place of residence, the City of Cleveland lost a proportional share of hub employment for all six hubs at a significant rate. While the number of workers as a whole is growing in some suburbs, with respect to the six employment hubs, no individual suburb has significantly increased its proportion of employees within the hubs.

Introduction

There are six hubs of employment in the NOACA region. A "hub" is defined in this study as a contiguous agglomeration of employment that in 2004 and 2014 employed at least 10,000 people. The six hubs, in decreasing order in the number of 2014 jobs, are:

1. Downtown/Near East Side
2. University Circle, including Midtown between E. 105 Street and E. 83 Street to incorporate related employment and activity around the Cleveland Clinic
3. Solon Cochran Corridor
4. Chagrin Highlands
5. I-77 & Rockside Area
6. Hopkins Airport Area

Maps that identify the precise boundaries used for each geography can be found in Section 2 of this Research Brief. The hubs are economic and thus indifferent to municipal boundaries. That said, three hubs are wholly contained within one city: the Downtown/Near East Side and University Circle hubs are in the City of Cleveland, and the I-77 & Rockside Area hub is in the City of Independence. The Solon Cochran Corridor lies within Solon and Glenwillow; Chagrin Highlands lies within Beachwood, Highland Hills, Warrensville Heights, and Orange; and the Hopkins Airport Area lies within Cleveland, Brook Park, Berea, Middleburg Heights, and Fairview Park.

This paper provides an analysis on these hubs in terms of:

1. The employment levels in each hub over time and the representation of these hubs relative to the region (Section 1. Findings & Comparative Data)
2. The job density and worker profile of each employment hub and the leading sectors of the hubs relative to that of the region (Section 1. Findings & Comparative Data)
3. The location of residence and trends for employees working in each hub (Section 2. Jobs per Hub and the Residences of Workers in the Main Employment Hubs)
4. The size and share of employment by industry within each employment hub (Section 3. Employment by Industry Sector by Hub)

Methodology

The data in this report were gathered from the U.S. Census Bureau's "OnTheMap" tool and then adjusted for federal employment as necessary and for known errors or aberrations in the data. The data used on jobs are for "All Jobs" as opposed to "Primary Jobs." A person may have a "main" job and also work a part-time job. The "second" job, by limitations in data collection, is not self-employment. From a transportation perspective, the second job, unless performed at home or colocated at a person's "main" job, requires use of the transportation system. Accordingly, for this study, with particular interests in transportation demand relevant to employment locations, it was deemed more accurate to use data for "all jobs" rather than "primary jobs."

An employment hub for this study is defined as any contiguous agglomeration of employment that in 2004 and 2014 employed at least 10,000 people. The density threshold for identifying an agglomeration was a minimum of 4,243 jobs per square mile regardless of the total number of jobs before examining adjacent areas that may decrease or increase the density of the original agglomeration. The job density value was derived using the Census Bureau's "OnTheMap" density layer that is automatically generated as a threshold based on a given metropolitan area's profile analysis.[3] The entire five-county area was the unit of analysis, and the largest continuous areas of at least 4,243 jobs per square mile in the region were selected and investigated to see if they met the 10,000 job threshold. Boundaries of the hubs were drawn to include the entire continuous density agglomeration, as well as any adjacent employment areas that represented a contiguous area of economic activity to the original density agglomeration. Care was taken to include only adjacent employment areas that were contiguous with and related to the core density agglomeration, even though the job density of the ultimately defined job hub, such as at the Hopkins Airport Area Hub, may have fallen below the original density threshold.

The value of 10,000 was selected as the basis for an employment hub as it is roughly 1% of the full Cleveland Metropolitan Statistical Area (MSA) employment and is small enough to capture any locations of employment significance, yet large enough, given the pronounced dispersion of jobs in the region, to identify clearly the largest hubs in the region.

[3]To determine the natural "breaks" for job densities, the Census Bureau's application code attempts to fit a second, third, and fourth order polynomial function to the query's min/max range. It then makes a determination as to which polynomial function produces the best set of intervals and chooses that one. The metric for the best set of intervals is the function that produces the most number of valid (i.e., monotonically increasing) breaks. In cases of a tie, the code prefers lower-order polynomial function.

Classification of a hub required the minimum of 10,000 jobs in both 2014 and 2004 to test for statistical aberrations in the data. Eliminating the 2004 requirement during the analysis, which may have identified new employment hubs in the region, did not result in any changes to the final output, however.

Limitations of the Data

The data are based on employer self-reporting both in terms of sector and location. Data were corrected in instances where it was known to be inaccurate; however, other cases may exist. In the case of employees of the City of Cleveland and Cuyahoga County, the location of work was accepted as presented by the Census Bureau, with the exception of Cuyahoga Community College employees. A detailed analysis of 2010 data that was provided to and used by the Census Bureau, however, reveals that the City of Cleveland and Cuyahoga County identified Downtown Cleveland as the location of employment for these organizations, even though both entities have work locations beyond Downtown. As it is possible that the City of Cleveland and Cuyahoga County reported correctly in some years but not others, the accuracy of any one year other than 2010 is not known. Hence, the data provided by the Census Bureau for the years used in this report—2004, 2009, and 2014—were accepted and used in this analysis as provided by the Census Bureau for City of Cleveland and Cuyahoga County workers, with the exception of Cuyahoga Community College employees, which were known to be incorrect in the study years and consequently corrected.

The data on the location of residence for employees of the six employment hubs for 2014 included 8,705 workers (3.8% of the total) with “home” reported in Franklin, Hamilton, Lucas, or Montgomery counties. Such aberrations are a known limitation of the data. The location of work may be different from a corporate headquarters, and the work location reporting may be based on the headquarters location. For example, an employee who lives in Columbus may work in Columbus for a company that is headquartered in Cleveland; however, if the workplace address is reported as Cleveland on tax forms (from which some data are sourced), then it would incorrectly appear that the individual works in Cleveland and lives in Columbus.

Comparing the data against “Journey to Work” data from Census Transportation Planning Products (CTPP 2006-2010, the most recent dataset available) supports the notion that, generally, the Columbus-, Cincinnati-, Toledo-, or Dayton-to-Cleveland commutes are errors in the data rather than actual commuting patterns for all instances. Furthermore, while the margin of error adds a small number of additional workers to the Cleveland hubs, the opposite is simultaneously true, that some workers from companies based in Franklin, Hamilton, Montgomery, and Lucas counties that are attributed to working in those counties (and living in Cuyahoga County) are actually working in Cuyahoga County. Hence, the errors on both sides balance each other to minimize the overall margin of error.

Prior to 2010, the data source did not include federal employees. In 2010, the data source began to include federal employees with the exception of active military, postal workers, and employees of secretive federal agencies. For this analysis, for the reader to identify trends and compare 2014 employment levels to earlier years (2004 and 2009), the federal employees that are included in the raw 2014 data were removed to create the same data set components. This was done only in the tables that compare the three data years (e.g., in Table 4, but not Table 1). Subtracting federal employees from 2014 was deemed preferable to determining the values for 2004 and 2009 and adding them to the corresponding years.

Finally, it should be noted that workers from temporary agencies are reported at the location of the office of the temporary agency and not necessarily where a worker is dispatched to work.

Thus the location of temporary agencies may cause some hub locations to have an employment level that is higher or lower than actual.

Section 1. Findings & Comparative Data

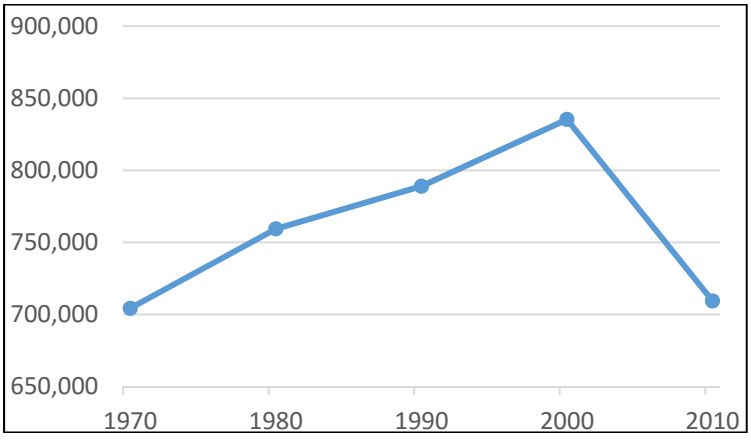
In the NOACA region, which shares the same boundaries as the Cleveland Metropolitan Statistical Area, there are approximately one million jobs across the five counties, with more than 72% of these jobs in Cuyahoga County.

Table 1. Employment by County in the Cleveland MSA, 2014[a]

County	Jobs, 2014
Cuyahoga	725,457
Lake	93,529
Lorain	95,641
Geauga	31,163
Medina'	58,290
Total	**1,004,080**

Note:
[a]The data does not capture self-employed persons, employers that have their own unemployment insurance (which is not common), U.S. Postal Service employees, active military, and secretive federal agencies.
Source: U.S. Census Bureau, "OnTheMap," 2014 data

Though Cuyahoga County is the economic center of the region, it has slowly lost its proportional share of the five-county region's employment, decreasing from 79.5% in 1970 to 71.3% in 2010, while both Lake and Medina counties experienced an increase of slightly more than 3% in the same period. Despite steadily losing proportional share, between 1970 and 2010, Cuyahoga County's employment actually increased from 1970 to its peak in 2000, growing 19%, before decreasing drastically (-15%) in the following 10 years that included the Great Recession (see Figure 2, below). According to Moody's Analytics, however, Cuyahoga County is projected to reach a new peak in 2037 with 836,530 jobs, though it will represent only 68.7% of the five-county employment, suggesting continued sprawl of jobs from the center outward if current trends continue unmitigated. Table 2 presents the employment by county, from 1970 to 2010.



Source: Moody's Economy.com Total Employment, excluding self-employment, private household workers, and military.

Figure 2. Employment by in Cuyahoga County, 1970-2010

Table 2. Employment by County in the Cleveland MSA, 1970-2010

Geography	1970	1980	1990	2000	2010	Change in Share of Regional Employment from 1970 to 2010
Cuyahoga County	704,260	759,370	788,980	835,310	709,280	-8.2%
Geauga County	14,370	18,980	25,910	35,000	33,880	1.8%
Lake County	58,950	74,350	87,770	106,070	96,560	3.1%
Lorain County	83,940	91,080	93,470	110,100	96,110	0.2%
Medina County	24,780	30,530	38,050	55,560	59,330	3.2%
Region	886,300	974,310	1,034,180	1,142,040	995,160	
Cuyahoga County % Share of Region	79.5%	77.9%	76.3%	73.1%	71.3%	

Note: This is a different data source from the U.S. Census Bureau "OnTheMap" data used elsewhere in this report; thus the employment numbers vary slightly and should not be compared to or combined with the "OnTheMap" data in any context. These data are comparable to "OnTheMap" data while allowing for an examination of historical trends. U.S. Census Bureau "OnTheMap" data does not exist prior to 2002.
Source: Moody's Economy.com Total Employment, excluding self-employment, private household workers, and military.

Examining employment in the five counties, six centers or "hubs" of employment were identified. An employment hub for this study is defined as any contiguous agglomeration of employment that in 2004 and 2014 employed at least 10,000 people.[4] The six hubs in the NOACA region account for nearly 232,000 jobs, which represents only 24.4% of all jobs in the region.

Table 3. Largest Employment Hubs, 2014[a]

Location	Jobs, 2014	Share of all jobs in the region
Downtown/Near East Side	109,589	10.9%
University Circle (to E. 83 St.)	55,465	5.5%
Solon Cochran Corridor	22,380	2.2%
Chagrin Highlands	20,541	2.0%
I-77-Rockside	19,222	1.9%
Hopkins Airport Area	18,072	1.8%
6-Hub Total	**245,269**	**24.4%**
All Jobs in the 5 Counties--2014	1,004,080	100.0%

Note:
[a]The data does not capture self-employed persons, employers that have their own unemployment insurance (which is not common), U.S. Postal Service employees, active military, and secretive federal agencies.
Source: U.S. Census Bureau, "OnTheMap" 2014 data

[4]See page 4 for a full discussion on the methodology employed.

Comparing 2004 and 2014, hub employment, excluding federal employees and self-employed persons, increased by 5,396 jobs (2.3%), while metropolitan employment, which includes the six hubs, witnessed a decrease of 33,863 jobs (-3.3%). Metropolitan employment outside the six hubs lost 39,259 jobs
(-4.9%). These data comport with the theory that employment agglomeration supports further job growth and attraction.

Also noteworthy is that hub employment as a percentage of regional employment increased from 21.0% in 2004 to 23.1% in 2009, before declining slightly to 22.6% in 2014. While further study would be required before conclusive statements can be made, the data may suggest greater employment resiliency for jobs within employment agglomerations during times of economic hardship and/or, more simply, that job agglomerations foster further growth, as the hubs in general grew while regional employment shrank. Of the six hubs, four grew and two shrank, with the majority (67%) of jobs lost in one of these hubs—Hopkins Airport Area—being attributed to losses in the manufacturing sector, the continuation of a decades-long national trend and global economics rather than a regional or local employment dynamic.

Table 4. Largest Employment Hubs and Employment in 2004, 2009 and 2014, Excluding all Federal Employment, Ranked by 2014 Data

Location	2004	2009	2014	Change 2004-2014	% Change 2004-2014
Downtown/Near East Side	125,156	115,043	106,946	-18,210	-14.5%
University Circle (to E. 83 St.)[a]	36,627	46,923	53,530	16,903	46.1%
Solon Cochran Corridor	17,485	18,079	22,375	4,890	28.0%
Chagrin Highlands	18,253	20,379	20,534	2,281	12.5%
I-77-Rockside	16,509	13,878	19,165	2,656	16.1%
Hopkins Airport Area	19,171	17,210	16,046	-3,125	-16.3%
6-Hub Total	**233,201**	**231,512**	**238,596**	**5,396**	**2.3%**
All Jobs in the Cleveland MSA	1,029,585	938,027	995,722	-33,863	-3.3%
Jobs in the Cleveland MSA exclusive of the six hubs	796,385	706,515	757,126	-39,259	-4.9%
Percentage of all NOACA jobs in hubs	22.6%	24.7%	24.0%		

Note:
The data does not capture self-employed persons, employers that have their own unemployment insurance (which is not common), and federal employees.
[a]For 2009 University Circle employment, an estimate was used based on a trend point between 2007 and 2010 due to a data aberration in the raw 2008 and 2009 data.
Source: U.S. Census Bureau, "OnTheMap," 2014 data

With 96,139 jobs, Downtown accounts for only 9.6% of all employment in the region, despite being the region's economic center. This figure is a subset of the Downtown/Near East Side geography presented in this study which encompasses 109,589 jobs. A 1985 study by the Greater Cleveland Growth Association, which used similar boundaries for Downtown, indicated 130,534 jobs in Downtown in 1980, which represented 15.1% of the Cleveland MSA, defined at

that time as Cuyahoga, Lake, Geauga, and Medina counties.[5] This demonstrates the long-term weakening of Downtown Cleveland as the region's economic center and supports the trend identified in Table 4.

Regarding job density, studies have shown that the agglomeration of activity is beneficial to economic growth. Examining the job density of the six largest employment hubs, University Circle, including the area around Cleveland Clinic, has the highest employment density in the region at 35,325 jobs per square mile. Solon Cochran Corridor and Hopkins Airport both have higher proportions of manufacturing jobs and thus lower density levels, as manufacturing generally requires more area per worker than the service and medical sectors. Also, nearly three square miles of the Hopkins Airport Area is the airport's airfield.

Table 5. Employment Hubs Density, 2014, Ranked by 2014 Data

Employment Hub	Jobs, 2014	Sq. Miles	Jobs/Sq. Mile
University Circle (to E. 83)	55,465	1.57	35,328
Downtown/Near East Side	109,589	4.97	22,050
I-77-Rockside	19,222	1.42	13,537
Chagrin Highlands	20,541	2.85	7,207
Solon Cochran Corridor	22,380	4.73	4,732
Hopkins Airport Area	18,072	8.61	2,099
6-Hub Total	**245,269**	**24.15**	**10,156**

Note:
The data does not capture self-employed persons, employers that have their own unemployment insurance (which is not common), U.S. Postal Service employees, active military, and secretive federal agencies.
Source: U.S. Census Bureau, "OnTheMap," 2014 data, and NOACA geospatial analysis

Who works in the hubs? An examination of the workers in each hub helps present a more complete profile of each hub and also points to potential transportation-related requirements. For example, lower-wage workers are generally more transit dependent than those with higher incomes. In terms of age, elderly workers may be more transit dependent than their younger counterparts. Even if these groups are found in large proportions within a hub, however, the real numbers that these persons represent (more so than the percentage of the total number of workers in the hub) play a key role in transportation policy decision making.

Also interesting to note is that for every male worker in University Circle, there are two female workers. In the Hopkins Airport Area hub, where the top two sectors are Transportation & Warehousing and Manufacturing, this gender composition is reversed, with 68% being male and 32% female. In terms of educational attainment, the largest category for Downtown, University Circle to E. 83, and Chagrin Highlands was "Bachelor's degree or advanced degree." For the remaining hubs, "Some college or Associate degree" was the largest category.

[5]Greater Cleveland Growth Association, *Downtown Cleveland Office and Retail Presentation*, October 1985, pp. 5-2 to 5-3.

Table 6. Profile of Workers in Each Employment Hub, 2014

	Downtown/ Near East Side	University Circle to E. 83 St.	Solon Cochran Corridor	Chagrin Highlands	I-77 & Rockside Area	Hopkins Airport Area
Worker Age						
29 or younger	17.3%	17.7%	17.9%	24.0%	28.3%	16.6%
30 to 54	58.3%	59.9%	58.3%	53.5%	55.0%	56.0%
55 or older	24.4%	22.3%	23.7%	22.5%	16.7%	27.4%
Worker Earnings						
$1,250 per month or less	17.7%	9.7%	9.9%	25.8%	32.4%	16.1%
$1,251 to $3,333 per month	28.6%	32.9%	32.9%	36.1%	35.4%	27.5%
More than $3,333 per month	53.7%	57.4%	57.2%	38.1%	32.2%	56.4%
Worker Race						
White	73.0%	72.2%	78.1%	76.9%	76.5%	83.7%
Black or African American	23.4%	20.8%	18.4%	19.9%	20.0%	12.9%
American Indian/Alaska Native	0.2%	0.2%	0.2%	0.1%	0.2%	0.4%
Asian	2.4%	5.6%	2.5%	2.1%	1.8%	1.9%
Native Hawaiian/Other Pacific Islander	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%
Two or More Races	1.0%	1.1%	0.8%	1.0%	1.4%	1.1%
Worker Ethnicity						
Not Hispanic or Latino	96.3%	97.2%	97.6%	97.8%	95.1%	95.1%
Hispanic or Latino	3.7%	2.8%	2.4%	2.2%	4.9%	4.9%
Worker Educational Attainment for workers aged 30 and over						
Less than high school	7.6%	6.6%	9.4%	8.2%	10.6%	7.9%
High school or equivalent, no college	23.9%	19.7%	31.2%	24.7%	28.5%	28.4%
Some college or Associate degree	31.8%	33.7%	33.2%	33.5%	31.7%	32.2%
Bachelor's degree or advanced degree	36.7%	39.9%	26.2%	33.6%	29.2%	31.5%
Worker Gender						
Male	50.6%	32.7%	62.8%	39.8%	54.7%	68.2%
Female	49.4%	67.3%	37.2%	60.2%	45.3%	31.8%

Note:
The data does not capture self-employed persons, employers that have their own unemployment insurance (which is not common), U.S. Postal Service employees, active military, and secretive federal agencies.
Source: U.S. Census Bureau, "OnTheMap," 2014 data

With respect to mobility, the U.S. Census Bureau estimates that 90,390 households, or 10.7%, in the five counties do not have cars. To maximize mobility, there is clearly a need for public transit; however, connecting residential and employment locations with sufficient frequency when both are so widely distributed in the region is probably not possible fiscally or practically. A future study may examine the feasibility of connecting transit-dependent neighborhoods to the identified or selected employment hubs, directly or through an intermediate transit hub. Alternatively, one solution may be to encourage new jobs at existing employment centers that are already, or easily can be, served by mass transit connecting to a broad geographic area. Additionally, examining the predominance of employment in each hub by industry sector, including trends, and the demographic characteristics of its workers may lead to more robust conclusions about transportation needs for each hub.

Location Quotient Analysis. Location Quotients (LQ) are ratios that allow one to compare the distribution of employment by industry to the distribution in a larger reference area. This analysis identifies local strengths and opportunities of the hubs compared to the region, and thus industry clusters and points of strengths and opportunities within the region potentially to leverage further regional growth. If an LQ equals 1.0, then the industry has the same share of its local employment as it does in the larger reference area. An LQ of 1.1 or greater indicates an industry with a greater share of the local area employment than is the case in the larger reference area. LQ calculations are typically done to compare a state or metropolitan region to a country, though in this case we compare the aggregate of the six employment hubs to the Cleveland MSA as a whole. The findings help identify the sectoral strengths of the hubs with respect to the full five-county region. Eleven sectors had an LQ of greater than 1.0 as detailed in Table 7, led by "Management of Companies and Enterprises"; "Professional, Scientific and Technical Services"; and "Arts, Entertainment and Recreation," whose proportions of employment was almost double that of the region as a whole.

Manufacturing, which is one of most negatively affected sectors in the regional economy (the region lost 54,000 jobs, or 29%, in this sector, between 2001 and 2014), represents only 6.3% of hub employment, compared to 12.4% of MSA employment. This smaller proportion of manufacturing jobs in the hubs compared to the MSA, in combination with the growth in the health care sector—at a stronger pace in the hubs than in the region as a whole—results in the economic strength of the hubs overall compared to the region. Downtown and the Hopkins Airport Area are the only hubs that lost workers between 2004 and 2014. With manufacturing being the second-largest employment sector at the Hopkins hub, it accounts for most of the hub's loss. Section 3, beginning on page 25, presents the industry sector breakdown for each of the six hubs. Table 7 presents the employment share by industry for the aggregate of the hubs compared to the region and the resulting location quotient.

Table 7. Location Quotient for the Employment Hubs vs. the Region, 2014

	Total of Six Employment Hubs		Cleveland MSA		Location Quotient
NAICS Industry Sector	Count	Share	Count	Share	
Management of Companies and Enterprises	12,622	5.1%	28,099	2.8%	1.84
Professional, Scientific, and Technical Services	25,602	10.4%	57,719	5.7%	1.82
Arts, Entertainment, and Recreation	8,008	3.3%	18,123	1.8%	1.81
Public Administration	15,510	6.3%	37,767	3.8%	1.68
Administration & Support, Waste Management and Remediation	23,311	9.5%	64,056	6.4%	1.49
Health Care and Social Assistance	58,075	23.7%	180,498	18.0%	1.32
Utilities	1,586	0.6%	5,224	0.5%	1.24
Finance and Insurance	13,273	5.4%	44,098	4.4%	1.23
Transportation and Warehousing	8,771	3.6%	30,415	3.0%	1.18
Real Estate and Rental and Leasing	4,475	1.8%	16,148	1.6%	1.13
Information	4,878	2.0%	18,792	1.9%	1.06
Educational Services	16,396	6.7%	78,319	7.8%	0.86
Wholesale Trade	9,365	3.8%	50,032	5.0%	0.77
Accommodation and Food Services	14,900	6.1%	79,870	8.0%	0.76
Other Services (excluding Public Administration)	4,897	2.0%	30,138	3.0%	0.67
Manufacturing	15,362	6.3%	124,444	12.4%	0.51
Construction	3,550	1.4%	34,115	3.4%	0.43
Mining, Quarrying, and Oil and Gas Extraction	53	0.0%	800	0.1%	0.27
Retail Trade	4,627	1.9%	102,929	10.3%	0.18
Agriculture, Forestry, Fishing and Hunting	8	0.0%	2,494	0.2%	0.01
TOTAL	**245,269**	**100.0%**	**1,004,080**	**100.0%**	

Source: U.S. Census Bureau, "OnTheMap," 2014 data

Section 2. Jobs per Hub and the Residences of Workers in the Main Employment Hubs

A. Downtown/Near East Side

Downtown/Near East Side, as expected, is the largest employment hub in Greater Cleveland. Despite being the economic center of the region, however, Downtown/Near East Side has steadily declined in the number of jobs, culminating in a 14.5% loss between 2004 and 2014. The map in Figure 3 indicates the boundaries of Downtown/Near East Side as defined in this study, with the darker shade of green in all of the following hub maps indicating the center of concentration of jobs within the hub. In 2014, there were around 2,600 non-U.S. Postal Service and non-secretive federal jobs that are not included in the table below to allow for comparisons with 2004 and 2009. Adding the large number of employees at the U.S Postal Service General Mail Facility on Orange Avenue would increase the hub's total for all years.

Table 8. Downtown/Near East Side Jobs[a]

	2004[b]	2009	2014[c]	% Change 2004-09	% Change 2009-14	% Change 2004-14
Downtown/Near East Side Jobs	125,156	115,043	106,946	-8.1%	-7.0%	-14.5%

Notes:

[a]The data does not capture self-employed persons, federal employees, or employers who have their own unemployment insurance (which is not common). Count adjustments were made for Cuyahoga Community College, which reports all workers as being at 700 Carnegie Avenue for all study years.

[b]For 2004 employment, an estimate was used based on a trend point between 2003 and 2005 due to a data aberration in the raw 2004 data.

[c]109,589 with federal employees, excluding U.S. Postal Service workers and those in secretive agencies.

Source: U.S. Census Bureau, "OnTheMap," 2003-05, 2009 and 2014 data

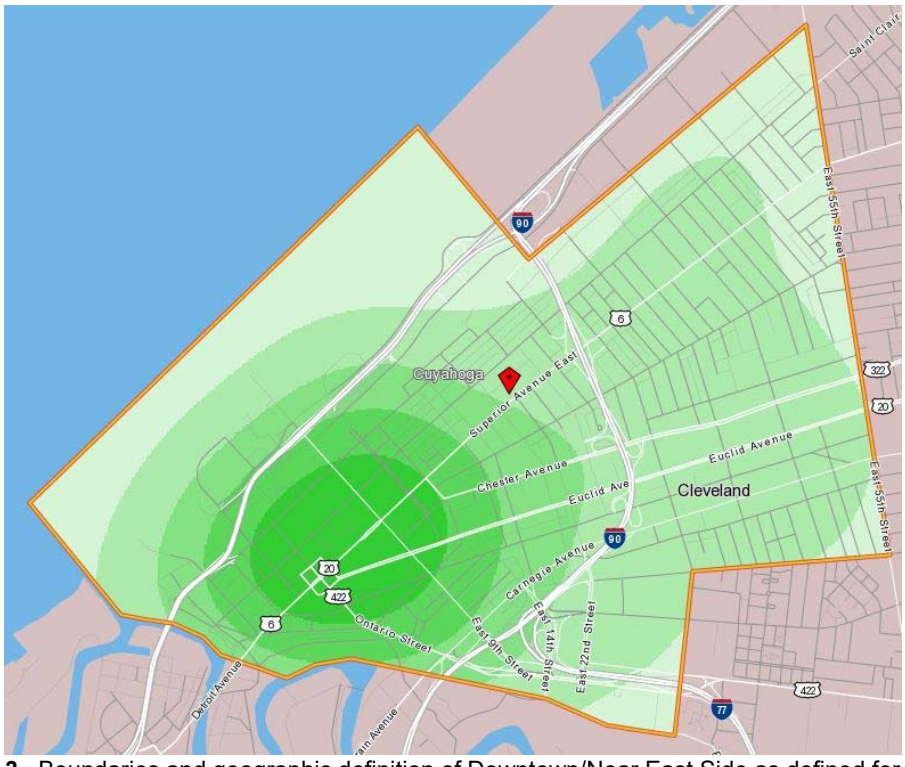


Figure 3. Boundaries and geographic definition of Downtown/Near East Side as defined for this analysis.

While the top two communities for residences—Cleveland and Parma—represent more than 25% of all employees, the distribution of residences for workers in Downtown/Near East Side is very broad as the top 25 communities make up only 59% of all locations. The proportion of employees who live in the City of Cleveland decreased significantly between 2004 and 2014 (-6.9%), while the proportion of employees who live outside the top 25 communities increased by 5%, which suggests increased movement from communities that traditionally housed Downtown/Near East Side employees. Of the top 25 communities, with the exception of Broadview Heights and Solon, the ones with the most consistent growth in proportion of Downtown/Near East Side employment have been on the West Side.

Table 9. Communities in which Downtown Employees Live

2014 Rank	City	2004 Share[a]	2009 Share[a]	2014 Share[b]	2014 Count[b]	Share Change 2004-14
1	Cleveland	29.5%	25.9%	22.6%	24,792	-6.9%
2	Parma	3.6%	3.9%	3.8%	4,148	0.1%
3	Lakewood	3.9%	3.8%	3.7%	4,096	-0.2%
4	Euclid	2.7%	2.5%	2.5%	2,764	-0.1%
5	Cleveland Heights	2.8%	2.7%	2.5%	2,734	-0.3%
6	Strongsville	1.9%	1.8%	2.0%	2,197	0.2%
7	Westlake	1.6%	1.7%	1.8%	1,966	0.2%
8	Shaker Heights	1.8%	1.7%	1.8%	1,921	0.0%
9	North Olmsted	1.6%	1.7%	1.5%	1,684	-0.1%
10	North Royalton	1.2%	1.3%	1.4%	1,512	0.2%
11	Rocky River	1.2%	1.3%	1.4%	1,510	0.2%
12	Garfield Heights	1.2%	1.3%	1.2%	1,325	0.0%
13	Fairview Park	1.0%	1.1%	1.1%	1,259	0.2%
14	North Ridgeville	0.7%	0.9%	1.1%	1,232	0.4%
15	Bay Village	1.0%	1.0%	1.1%	1,230	0.1%
16	Akron	1.1%	1.2%	1.1%	1,197	0.0%
17	South Euclid	1.1%	1.1%	1.1%	1,173	0.0%
18	Avon Lake	0.8%	0.9%	1.0%	1,095	0.2%
19	Maple Heights	1.2%	1.1%	1.0%	1,079	-0.2%
20	Broadview Heights	0.7%	0.7%	0.9%	1,032	0.3%
21	Parma Heights	0.9%	0.8%	0.9%	988	0.0%
22	Avon	0.4%	0.6%	0.9%	967	0.4%
23	Solon	0.7%	0.8%	0.9%	948	0.2%
24	Middleburg Heights	0.6%	0.8%	0.8%	909	0.2%
25	Brook Park	0.8%	0.8%	0.8%	907	0.1%
	All Other Locations	36.0%	38.5%	41.0%	44,926	5.0%
	Total	**100%**	**100%**	**100%**	**109,589**	

Experienced % share growth between each data year shown.
Experienced % share decline between each data year shown.

Notes:
The data does not capture self-employed persons and employers that have their own unemployment insurance (which is not common). Count, but not share, adjustments were made for Cuyahoga Community College, which reports all workers as being at 700 Carnegie Ave for all study years. Communities that appeared in the top 25 in the raw data that are likely data aberrations were removed from the list. See the methodology section on page 4 for more discussion on this topic.
[a]Excludes all federal workers.
[b]Includes federal workers for 2014 except U.S. Postal Service employees, active military, and secretive federal agencies. (Federal workers were not counted in 2004 or 2009.)
Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

B. University Circle

University Circle is the second-largest employment hub in Greater Cleveland. The hub comprises University Circle and Midtown between E. 83 St. and E. 105 St. to incorporate related employment and activity at and around the Cleveland Clinic. A map of this geography may be found in Figure 4. Employment between 2004 and 2014 grew 46%, the largest increase of all job hubs in the region, attributable to the health of the "eds and meds" sectors, which make up the majority of employment in this hub. (The industry breakdown for this hub can be found in Table 21.)

Table 10. University Circle Jobs[a]

	2004	2009[b]	2014[c]	% Change 2004-09	% Change 2009-14	% Change 2004-14
University Circle Jobs	36,627	46,923	53,530	28.1%	14.1%	46.1%

Notes:
[a]The data does not capture self-employed persons, federal employees (including VA Hospital staff), or employers who have their own unemployment insurance (which is not common).
[b]For 2009 employment, an estimate was used based on a trend point between 2007 and 2011 due to a data aberration in the raw 2008 and 2009 data.
[c]55,465 with non-U.S. Postal Service federal employees. The VA Hospital is a major employer in this hub.
Source: U.S. Census Bureau, "OnTheMap," 2004, 2007-2011 and 2014 data for "All jobs"

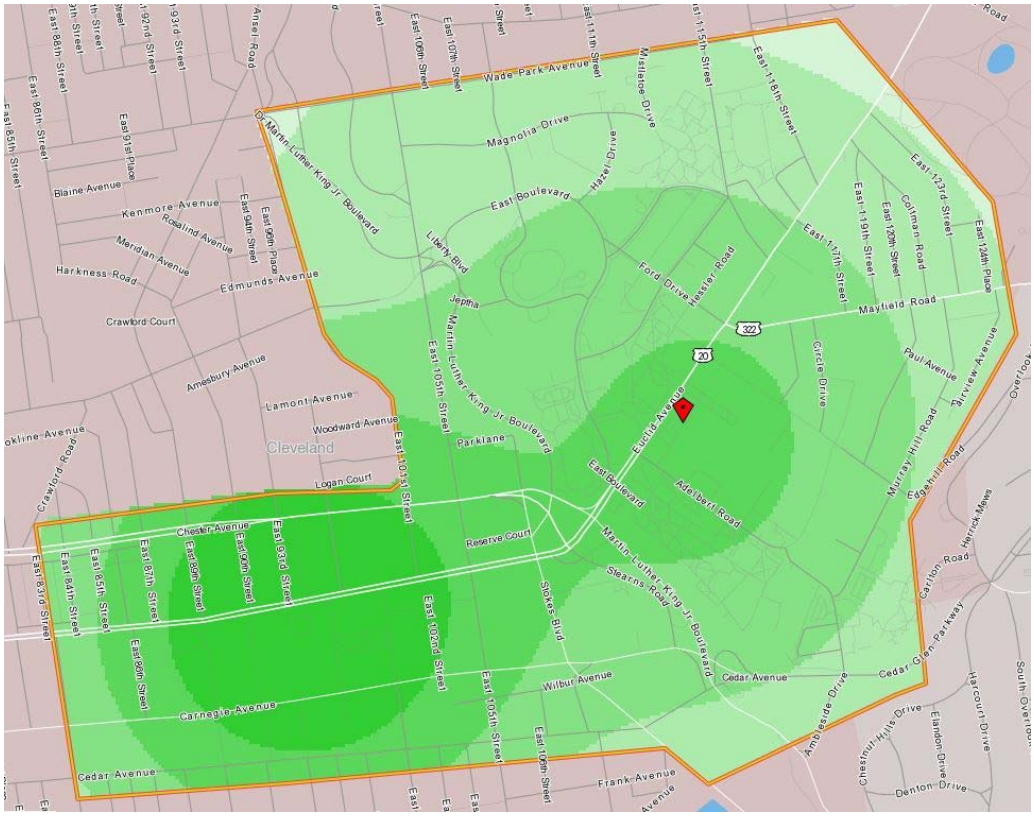


Figure 4. Boundaries and geographic definition of University Circle (including Midtown between E. 83 and E. 105) as defined for this analysis.

While the top three communities represent more than 25% of all employees, the distribution of residences for workers in University Circle is very broad, as the top 25 communities make up only 59% of all locations. The proportion of employees living in the City of Cleveland decreased significantly between 2004 and 2014 at -5.1%, while the proportion of employees living outside the top 25 communities increased by 8%, which suggests increased movement from communities that traditionally housed University Circle employees. Interestingly, of the top 25 communities, with the exception of Solon and Beachwood, the ones with the most consistent growth in proportion of University Circle employment have been on the West Side, compared to the East Side. Every community (excluding Cleveland) that shows a consistent decrease in proportion of University Circle employment has been on the East Side.

Table 11. Communities in which University Circle Employees Live

2014 Rank	City	2004 Share[a]	2010 Share[b,c]	2014 Share[b,d]	2014 Count[b,d]	Share Change 2004-14
1	Cleveland	21.5%	18.3%	16.4%	9,121	-5.1%
2	Cleveland Heights	7.8%	6.6%	5.7%	3,188	-2.1%
3	Shaker Heights	5.2%	4.4%	4.3%	2,380	-0.9%
4	Lakewood	2.6%	2.7%	2.9%	1,626	0.4%
5	Parma	2.4%	2.9%	2.9%	1,613	0.5%
6	Euclid	3.8%	3.3%	2.9%	1,593	-0.9%
7	South Euclid	2.4%	2.1%	1.9%	1,043	-0.5%
8	Strongsville	1.7%	1.8%	1.9%	1,030	0.2%
9	Solon	1.5%	1.6%	1.7%	967	0.2%
10	Beachwood	1.1%	1.4%	1.6%	883	0.5%
11	Westlake	1.3%	1.3%	1.4%	804	0.1%
12	North Olmsted	1.4%	1.6%	1.4%	797	0.0%
13	University Heights	1.6%	1.5%	1.3%	711	-0.3%
14	Mayfield Heights	1.3%	1.3%	1.3%	710	0.0%
15	Lyndhurst	1.4%	1.2%	1.3%	694	-0.1%
16	Mentor	1.3%	1.4%	1.2%	688	0.0%
17	North Royalton	1.0%	1.4%	1.2%	642	0.1%
18	Maple Heights	1.3%	1.2%	1.1%	635	-0.1%
19	Garfield Heights	1.0%	1.3%	1.1%	625	0.1%
20	Willoughby	1.0%	1.0%	1.0%	547	0.0%
21	Broadview Heights	0.9%	1.0%	0.9%	520	0.1%
22	Rocky River	0.8%	0.8%	0.9%	488	0.1%
23	Fairview Park	0.6%	0.8%	0.9%	483	0.2%
24	East Cleveland	1.6%	1.0%	0.8%	462	-0.8%
25	Parma Heights	0.6%	0.7%	0.8%	451	0.2%
	All Other Locations	33.0%	37.3%	41.0%	22,764	8.0%
	TOTAL	100.0%	100.0%	100.0%	55,465	

Experienced % share growth between each data year shown.
Experienced % share decline between each data year shown.

Notes: The data does not capture self-employed persons and employers that have their own unemployment insurance (which is not common). Communities that appeared in the top 25 in the raw data that are likely data aberrations were removed from the list. See the methodology section on page 4 for more discussion on this topic.

[a]Excludes all federal workers.

[b]Includes federal workers for except U.S. Postal Service employees, active military, and secretive federal agencies. (Federal workers were not counted in 2004.)

[c]For the residential distribution of employees, 2010 was used instead of 2009 due to a higher confidence level in the 2010 data compared to the 2009 data.

[d]Includes 1,935 non-U.S. Postal federal workers, many of whom are likely at the VA Hospital.

Source: U.S. Census Bureau, "OnTheMap," 2004, 2007-2011 and 2014 data for "All jobs"

C. Solon Cochran Corridor

The Solon Cochran Corridor is the third-largest employment hub in Greater Cleveland, with approximately 22,000 jobs, as presented in Table 12. Like two other hubs—University Circle and Chagrin Highlands—the Solon Cochran Corridor shows an increase between 2004 and 2009, despite the Great Recession. Overall, the hub showed strong job growth, at 28%, between 2004 and 2014. Figure 5 indicates the boundaries of the Solon Cochran Corridor employment hub as defined in this study.

Table 12. Solon Cochran Corridor Jobs[a]

	2004	2009	2014[b]	% Change 2004-09	% Change 2009-14	% Change 2004-14
Solon Cochran Corridor Jobs	17,485	18,079	22,375	3.4%	23.8%	28.0%

Notes:
[a]The data does not capture self-employed persons, federal employees, or employers who have their own unemployment insurance (which is not common).
[b]22,380 with non-U.S. Postal Service federal employees.
Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

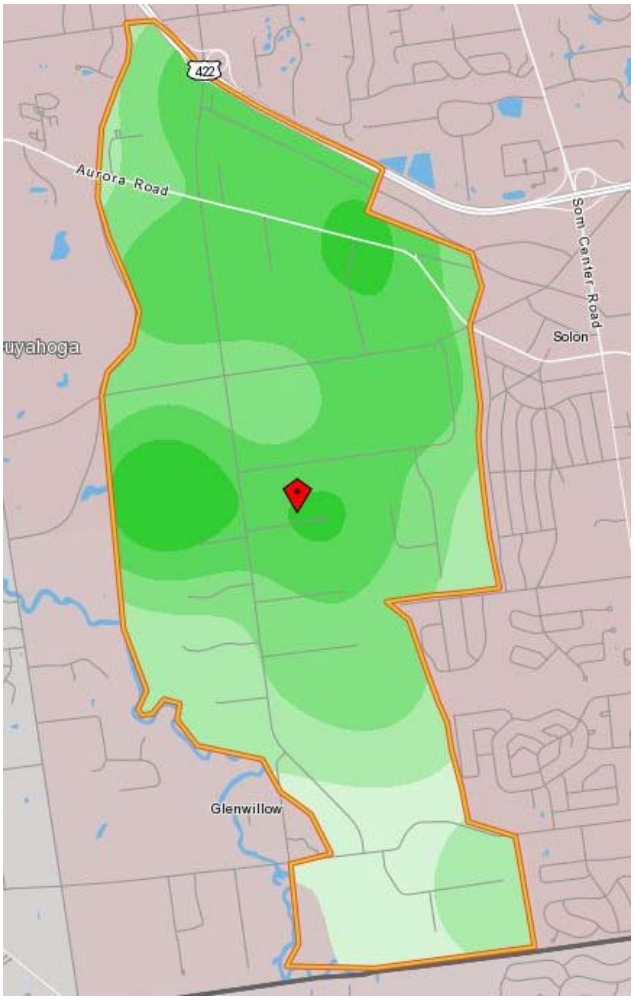


Figure 5. Boundaries and geographic definition of the Solon Cochran Corridor as defined for this analysis.

Employees in the Solon Cochran Corridor are less concentrated geographically than those of Downtown or University Circle. The proportional loss from the City of Cleveland was lower in Solon than in the other two locations, at only 2.3% of the proportional share between 2004 and 2014 (during which time overall employment grew 28%, resulting in the actual number of workers from the City of Cleveland to have grown slightly from 2,047 workers to 2,108 workers). Of the top 25 communities, with the exception of Parma, those with a consistent increase in proportion of employment were all in Summit County. Table 14 identifies the top 25 communities of residence for employees of this hub.

Table 13. Communities in which Solon Cochran Corridor Employees Live

2014 Rank	City	2004 Share[a]	2009 Share[a]	2014 Share[b]	2014 Count[b]	Share Change 2004-14
1	Cleveland	11.7%	10.9%	9.4%	2,108	-2.3%
2	Solon	4.9%	4.3%	4.3%	962	-0.6%
3	Parma	2.7%	2.8%	3.3%	742	0.6%
4	Twinsburg	2.9%	3.1%	3.1%	701	0.3%
5	Maple Heights	2.9%	2.6%	2.2%	499	-0.7%
6	Garfield Heights	2.6%	2.4%	2.2%	495	-0.4%
7	Akron	1.4%	1.3%	2.0%	456	0.6%
8	Streetsboro	1.8%	1.7%	2.0%	452	0.3%
9	Aurora	2.0%	1.9%	2.0%	447	0.0%
10	Bedford	1.7%	1.5%	2.0%	441	0.3%
11	Euclid	2.1%	1.7%	1.6%	362	-0.4%
12	Mentor	1.6%	1.3%	1.6%	352	-0.1%
13	Bedford Heights	1.7%	1.2%	1.4%	323	-0.3%
14	Cleveland Heights	1.9%	1.5%	1.4%	321	-0.5%
15	Macedonia	1.2%	1.2%	1.3%	300	0.2%
16	Cuyahoga Falls	1.0%	1.4%	1.3%	299	0.3%
17	Hudson	1.0%	1.2%	1.2%	273	0.2%
18	Warrensville Heights	1.3%	1.2%	1.2%	261	-0.2%
19	North Royalton	0.9%	0.7%	1.1%	241	0.1%
20	Bainbridge Township	1.2%	1.3%	1.1%	237	-0.2%
21	South Euclid	1.0%	1.1%	1.0%	232	0.1%
22	Mayfield Heights	1.0%	1.0%	1.0%	231	0.1%
23	Stow	0.7%	0.8%	1.0%	215	0.3%
24	Shaker Heights	0.9%	1.1%	0.9%	210	0.0%
25	Lakewood	1.0%	0.9%	0.9%	199	-0.1%
	All Other Locations	46.9%	49.7%	49.2%	11,021	2.4%
	Total	100.0%	100.0%	100.0%	22,380	

Experienced % share growth between each data year shown.
Experienced % share decline between each data year shown.

Notes:
The data does not capture self-employed persons and employers that have their own unemployment insurance (which is not common). Communities that appeared in the top 25 in the raw data that are likely data aberrations were removed from the list. See the methodology section on page 4 for more discussion on this topic.
[a]Excludes all federal workers.
[b]Includes federal workers except U.S. Postal Service employees, active military, and secretive federal agencies. (Federal workers were not counted in 2004 or 2009.)
Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

D. Chagrin Highlands

Chagrin Highlands is the fourth-largest employment hub in Greater Cleveland, with approximately 20,500 jobs, as presented in Table 14. Like two other hubs—University Circle and Solon Cochran Corridor—Chagrin Highlands experienced an increase in jobs between 2004 and 2009, despite the Great Recession. Overall, the hub grew by 12.5% between 2004 and 2014; however, between 2009 and 2014 the increase in jobs was negligible. Although up to 700 Cleveland Clinic jobs were expected to move from Collinwood to Chagrin Highlands in 2014, they may not yet be counted in the Census Bureau's data and are expected to appear in the 2015 data yet to be released. Despite major increases between 2009 and 2014 in the Health Care & Social Assistance and the Accommodation & Food Services sectors (1,011 jobs), major losses offset them in three sectors: Professional, Scientific, and Technical Services; Manufacturing; and Finance and Insurance (2,686 jobs). For this analysis, "Chagrin Highlands" is defined as the contiguous agglomeration of economic activity centered around I-271 at its interchanges with Chagrin Boulevard and Harvard Road, as depicted in Figure 6. This geography may be larger than the generally marketed term of Chagrin Highlands.

Table 14. Chagrin Highlands Jobs[a]

	2004	2009	2014[b]	% Change 2004-09	% Change 2009-14	% Change 2004-14
Chagrin Highlands Jobs	18,253	20,379	20,534	11.6%	0.8%	12.5%

Notes:

[a]The data does not capture self-employed persons, federal employees, or employers who have their own unemployment insurance (which is not common). Count adjustments were made for Cuyahoga Community College, which reports all workers being at 700 Carnegie Avenue for all study years, and for Eaton Corporation for 2014, whose workforce data is thought to be suppressed by the Census Bureau due to confidentiality concerns.

[b]20,541 with non-U.S. Postal federal employees.

Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

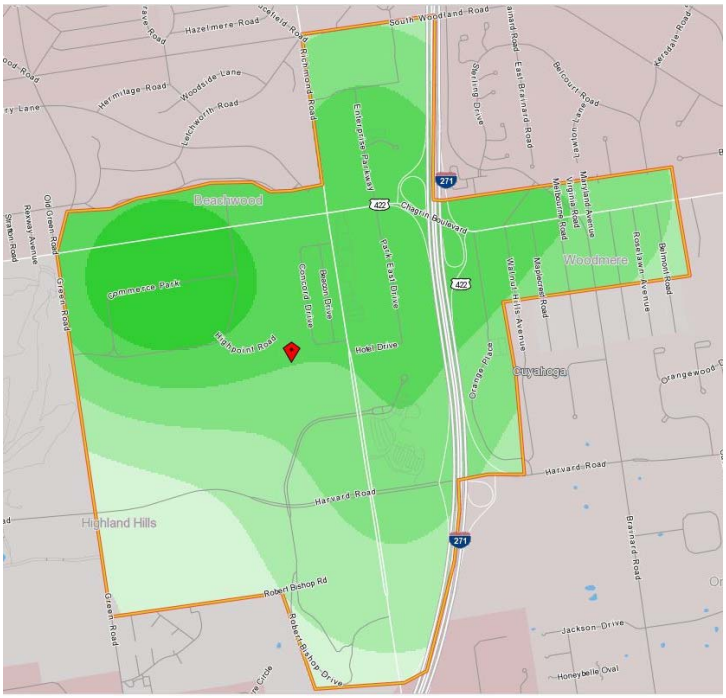


Figure 6. Boundaries and geographic definition of Chagrin Highlands as defined for this analysis.

Like the other job hubs, the distribution of residences for employees at Chagrin Highlands is spread broadly among communities. The City of Cleveland lost a significant proportional share of workers, with a proportional decrease of 4.8% between 2004 and 2014, while the raw number of jobs increased 9%. Of the top 25 communities, all four that experienced a consistent proportional increase are on the East Side, and the four that experienced a consistent proportional decrease (excluding Cleveland) are to the east and south of Cleveland. Table 15 identifies the top 25 communities of residence for employees of this hub.

Table 15. Communities in which Chagrin Highlands Employees Live

2014 Rank	City	2004 Share[a]	2009 Share[a]	2014 Share[b]	2014 Count[b]	Share Change 2004-14
1	Cleveland	15.7%	11.8%	10.9%	2,232	-4.8%
2	Cleveland Heights	3.0%	3.0%	3.0%	625	0.1%
3	Shaker Heights	2.7%	2.9%	3.0%	613	0.3%
4	Solon	2.4%	2.3%	2.4%	498	0.0%
5	South Euclid	2.3%	2.4%	2.4%	483	0.0%
6	Mayfield Heights	2.0%	1.9%	2.3%	482	0.4%
7	Beachwood	2.6%	2.0%	2.3%	470	-0.3%
8	Parma	2.3%	2.4%	2.2%	458	-0.1%
9	Euclid	2.7%	2.2%	2.1%	429	-0.6%
10	Mentor	2.1%	1.8%	1.9%	385	-0.2%
11	Lyndhurst	1.6%	1.7%	1.7%	340	0.0%
12	Twinsburg	1.2%	1.5%	1.6%	322	0.3%
13	Akron	1.8%	1.7%	1.4%	295	-0.3%
14	Garfield Heights	1.5%	1.6%	1.3%	275	-0.2%
15	University Heights	1.5%	1.3%	1.3%	273	-0.2%
16	Maple Heights	1.5%	1.6%	1.3%	265	-0.2%
17	Warrensville Heights	1.4%	1.3%	1.2%	253	-0.1%
18	Willoughby	1.0%	1.2%	1.2%	243	0.2%
19	Strongsville	1.0%	0.9%	1.0%	212	0.0%
20	Bainbridge Twp	1.0%	0.9%	1.0%	204	0.0%
21	Pepper Pike	1.0%	0.9%	1.0%	197	0.0%
22	Streetsboro	0.5%	0.7%	0.9%	195	0.5%
23	Lakewood	1.1%	1.2%	0.9%	194	-0.2%
24	Aurora	0.9%	0.7%	0.9%	189	0.0%
25	Bedford	0.9%	0.9%	0.9%	177	0.0%
	All Other Locations	44.3%	49.2%	49.8%	10,233	5.5%
	Total	100.0%	100.0%	100.0%	20,541	

Experienced % share growth between each data year shown.
Experienced % share decline between each data year shown.

Notes:
The data does not capture self-employed persons or employers who have their own unemployment insurance (which is not common). Count, but not share, adjustments were made for Cuyahoga Community College, which reports all workers as being located at 700 Carnegie Ave for all study years, and for Eaton Corporation for 2014, whose workforce data is thought to be suppressed by the Census Bureau due to confidentiality concerns. Communities that appeared in the top 25 in the raw data that are likely data aberrations were removed from the list. See the methodology section on page 4 for more on this topic.
[a]Excludes all federal workers.
[b]Includes federal workers except U.S. Postal Service employees, active military, and secretive federal agencies. (Federal workers were not counted in 2004 or 2009.)
Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

E. I-77 & Rockside Area

The I-77 & Rockside Area is the fifth-largest employment hub in Greater Cleveland, with approximately 19,000 jobs, as presented in Table 16. After significant job losses during the Great Recession, the area rebounded strongly, posting an overall growth of 16% between 2004 and 2014. The map in Figure 7, below, depicts the geographic boundaries of this hub.

Table 16. I-77 & Rockside Area Jobs[a]

	2004	2009	2014[b]	% Change 2004-09	% Change 2009-14	% Change 2004-14
77-Rockside Jobs	16,509	13,878	19,165	-15.9%	38.1%	16.1%

Notes:
[a]The data does not capture self-employed persons, federal employees, or employers who have their own unemployment insurance (which is not common).
[b]19,222 with non-U.S. Postal Service federal employees.
Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

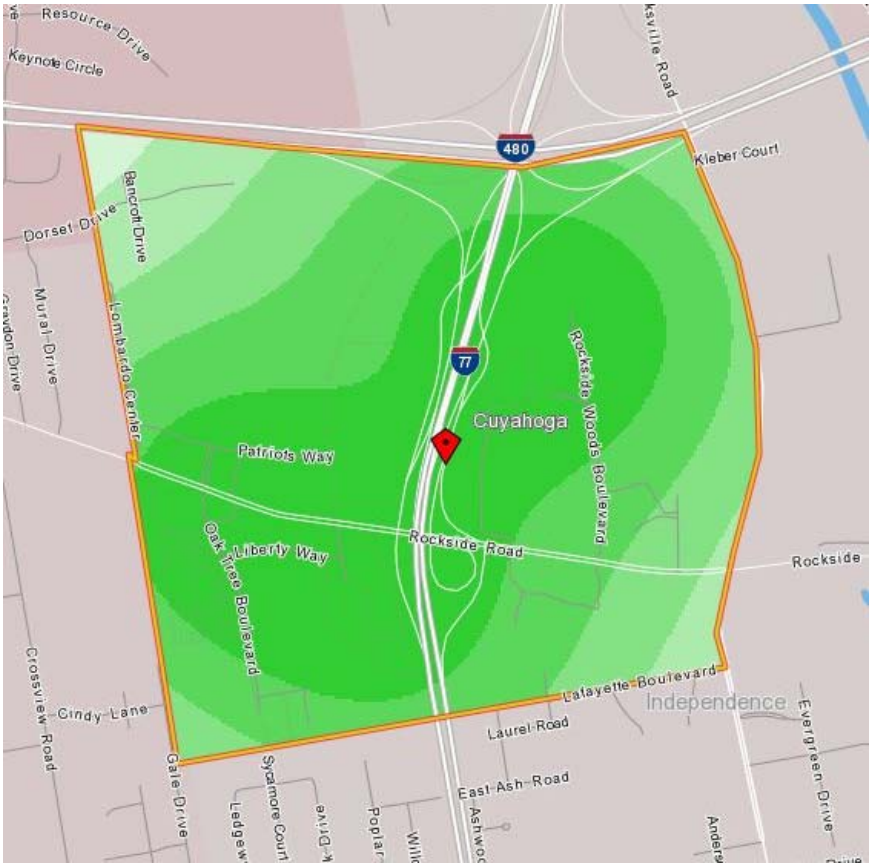


Figure 7. Boundaries and geographic definition of the I-77 & Rockside Area as defined for this analysis.

Though three communities—Cleveland, Parma, and Akron—make up a notable proportion of residences for workers in the I-77 & Rockside employment hub at 21%, like the other hubs the bulk of home locations are spread throughout the region. Of the top 25 communities, all three of the ones that experienced a consistent proportional increase are on the West Side. Though the City of Cleveland's proportional share of workers decreased 4% between 2004 and 2014, this job hub is the only employment hub of the six where the City of Cleveland experienced an increase in its proportion of employment between 2009 and 2014. Table 17 identifies the top 25 communities of residence for employees of this hub.

Table 17. Communities in which I-77 & Rockside Area Employees Live

2014 Rank	City	2004 Share[a]	2009 Share[a]	2014 Share[b]	2014 Count[b]	Share Change 2004-14
1	Cleveland	17.4%	12.5%	13.0%	2,495	-4.4%
2	Parma	4.8%	5.2%	4.7%	900	-0.1%
3	Akron	3.2%	1.7%	3.2%	624	0.0%
4	Lorain	1.3%	0.6%	1.9%	358	0.5%
5	Lakewood	2.1%	2.3%	1.8%	344	-0.3%
6	Garfield Heights	2.0%	1.9%	1.7%	335	-0.3%
7	Elyria	1.1%	0.5%	1.6%	314	0.5%
8	Strongsville	2.0%	2.0%	1.5%	293	-0.1%
9	North Royalton	1.7%	1.6%	1.4%	268	-0.4%
10	Parma Heights	1.0%	1.0%	1.2%	228	0.2%
11	Broadview Heights	1.1%	1.6%	1.2%	223	0.1%
12	Euclid	1.3%	1.3%	1.1%	215	-0.1%
13	Maple Heights	1.1%	1.3%	1.1%	206	-0.1%
14	Brunswick	1.2%	1.5%	1.0%	196	-0.2%
15	North Olmsted	1.2%	1.0%	0.9%	178	-0.3%
16	Cleveland Heights	1.1%	0.9%	0.9%	171	-0.2%
17	Seven Hills	0.8%	1.1%	0.9%	170	0.1%
18	North Ridgeville	0.6%	0.7%	0.9%	170	0.2%
19	Westlake	0.8%	1.1%	0.9%	168	0.1%
20	Brecksville	1.0%	1.2%	0.8%	158	-0.2%
21	Independence	1.1%	1.3%	0.8%	150	-0.3%
22	Brook Park	0.7%	0.8%	0.7%	140	0.0%
23	Fairview Park	0.5%	0.7%	0.7%	137	0.2%
24	Cuyahoga Falls	0.9%	0.8%	0.7%	131	-0.3%
25	Rocky River	0.7%	0.8%	0.6%	119	-0.1%
	All Other Locations	49.5%	55.0%	54.8%	10,531	5.3%
	Total	100%	100%	100%	19,222	

Experienced % share growth between each data year shown.
Experienced % share decline between each data year shown.

Notes:
The data does not capture self-employed persons or employers who have their own unemployment insurance (which is not common). Communities that appeared in the top 25 in the raw data that are likely data aberrations were removed from the list. See the section on page 4 for more discussion on this topic.
[a]Excludes all federal workers.
[b]Includes federal workers except U.S. Postal Service employees, active military, and secretive federal agencies. (Federal workers were not counted in 2004 or 2009.)
Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

F. Hopkins Airport Area

The area around Hopkins Airport has approximately 16,000 jobs as of 2014 (excluding federal jobs), as presented in Table 18, with the boundaries of the hub depicted in Figure 7. Between 2004 and 2009 and between 2009 and 2014, this area has steadily lost jobs. Overall, the hub shrank by 16% between 2004 and 2014; 2,100 of these jobs (67% of the overall loss) were in manufacturing. Among the six employment hubs analyzed here, the Hopkins Airport Area hub ranked sixth with 16,046 jobs excluding federal employees, and 18,072 jobs including non-U.S. Postal Service and non-secretive federal agency jobs. Adding the employment of the United States Postal Service Air Mail Facility at Hopkins Airport would increase the hub's total even more for all years. Though the Hopkins Airport Area hub ranked sixth in 2014, it ranked third after Downtown Cleveland and University Circle in 2004.

Table 18. Hopkins Airport Area Jobs[a]

	2004	2009	2014[b]	% Change 2004-09	% Change 2009-14	% Change 2004-14
Hopkins Airport Area Jobs	19,171	17,210	16,046	-10.2%	-6.8%	-16.3%

Notes:
[a]The data does not capture self-employed persons, federal employees of employers who have their own unemployment insurance (which is not common).
[b]18,072 with non-U.S. Postal Service federal employees. NASA and U.S. Customs are major employers in this hub.
Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

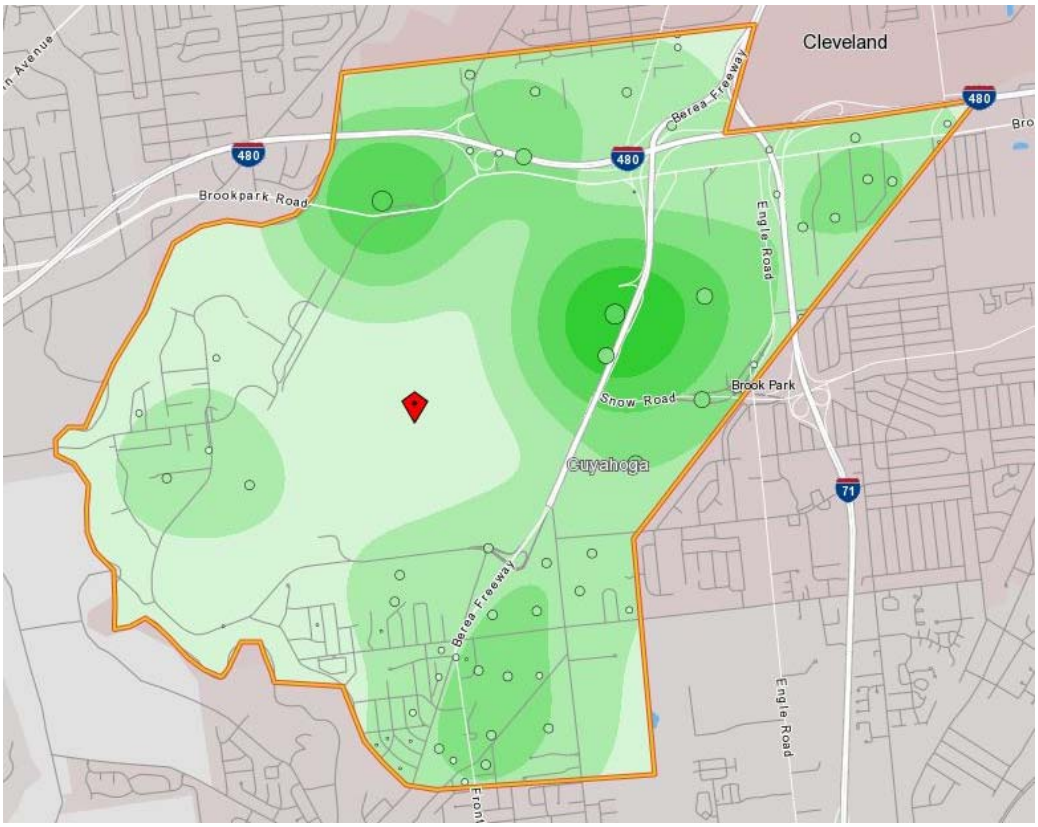


Figure 8. Boundaries and geographic definition of the Hopkins Airport Area as defined for this analysis.

Fewer trends can be spotted in the proportional composition of the top 25 communities of residence for employees of the Hopkins Airport Area hub than for the other five hubs. Only two communities demonstrated a consistently increasing share, North Olmsted and North Ridgeville, and only two communities showed a consistently decreasing share, Cleveland and Elyria. Like the other hubs, residential distribution is diverse, but unlike the others, the locations of residence are primarily on one side of town. Of the top 24 communities (the top 25 less the City of Cleveland), 22 (92%) are on the West Side, with Euclid and Akron being the two exceptions. Table 20 identifies the top 25 communities of residence for employees of this hub.

Table 19. Communities in which Hopkins Airport Area Employees Live

2014 Rank	City	2004 Share[a]	2009 Share[a]	2014 Share[b]	2014 Count[b]	Share Change 2004-14
1	Cleveland	17.6%	15.8%	13.5%	2,431	-4.2%
2	Parma	4.9%	4.8%	5.2%	940	0.3%
3	Strongsville	3.4%	3.1%	3.4%	614	0.0%
4	North Olmsted	2.6%	2.7%	3.0%	545	0.4%
5	Brook Park	3.7%	3.0%	3.0%	542	-0.7%
6	Lakewood	2.8%	2.7%	2.8%	511	0.0%
7	Berea	2.5%	2.4%	2.8%	505	0.3%
8	Brunswick	2.5%	2.8%	2.5%	457	0.0%
9	Elyria	2.5%	2.4%	2.2%	405	-0.2%
10	North Ridgeville	1.5%	2.0%	2.1%	376	0.5%
11	Westlake	1.8%	1.4%	2.1%	373	0.2%
12	Lorain	2.5%	2.7%	1.9%	352	-0.6%
13	North Royalton	1.7%	1.5%	1.8%	333	0.1%
14	Fairview Park	1.4%	1.4%	1.7%	309	0.3%
15	Parma Heights	1.5%	1.4%	1.7%	300	0.2%
16	Middleburg Heights	1.7%	1.5%	1.6%	291	-0.1%
17	Olmsted Twp	1.0%	0.9%	1.4%	250	0.3%
18	Rocky River	1.1%	1.0%	1.2%	223	0.1%
19	Medina	1.4%	1.4%	1.1%	204	-0.3%
20	Avon Lake	1.1%	1.1%	1.1%	200	0.0%
21	Akron	1.0%	0.9%	1.0%	188	0.0%
22	Avon	0.6%	0.5%	1.0%	179	0.4%
23	Olmsted Falls	0.8%	0.8%	0.9%	156	0.1%
24	Bay Village	0.7%	0.6%	0.8%	139	0.1%
25	Euclid	0.7%	0.7%	0.8%	136	0.0%
	All Other Locations	36.9%	40.7%	39.4%	7,113	2.5%
	Total	100.0%	100.0%	100.0%	18,072	

Experienced % share growth between each data year shown.
Experienced % share decline between each data year shown.

Notes:
The data does not capture self-employed persons or employers that have their own unemployment insurance (which is not common). Communities that appeared in the top 25 in the raw data that are likely data aberrations were removed from the list. See the methodology section on page 4 for more discussion on this topic.

[a]Excludes all federal workers.

[b]Includes federal workers except U.S. Postal Service employees, active military, and secretive federal agencies. (Federal workers were not counted in 2004 or 2009.) 2,026 such workers are counted for 2014. NASA and U.S. Customs have large facilities in this area.

Source: U.S. Census Bureau, "OnTheMap," 2004, 2009 and 2014 data

Section 3. Employment by Industry Sector by Hub

The tables in this section show the breakdown by industry sector for each of the six hubs. The tables present only 2014 data, because comparisons across years for small geographies increase data inaccuracies and because 2014 data include non-U.S. Postal Service and non-secretive agency governmental employees who are not present in the 2004 and 2009 data. Thus, to allow the reader to compare sectors over time, the federal employees would have to be removed from the 2014 data rather than added to the 2004 and 2009 data, as there is a more complete data set for 2014 compared to the 2004 and 2009 data; this would result in 2014 data being less complete than possible.

As there is correlation between lower-paid jobs and transit dependency, a more in-depth analysis of trends for a particular industry sector at the employment hub geographic level could be undertaken if warranted. Moreover, some industry sectors, such as retail and service jobs, generate more trips to their locations than other sectors, such as industrial or manufacturing jobs, and thus could warrant additional study regarding the demand on the transportation system at the hubs by certain industry sectors.

Table 20. Jobs by North American Industry Classification System (NAICS) Industry Sector, 2014 – Downtown

Rank	NAICS Industry Sector	Count	Share
1	Professional, Scientific, and Technical Services	17,941	16.4%
2	Public Administration	13,265	12.1%
3	Administration & Support, Waste Management and Remediation	9,760	8.9%
4	Educational Services	9,244	8.4%
5	Finance and Insurance	8,887	8.1%
6	Health Care and Social Assistance	8,828	8.1%
7	Management of Companies and Enterprises	8,657	7.9%
8	Accommodation and Food Services	6,188	5.6%
9	Arts, Entertainment, and Recreation	6,060	5.5%
10	Information	3,314	3.0%
11	Wholesale Trade	3,141	2.9%
12	Other Services (excluding Public Administration)	3,056	2.8%
13	Transportation and Warehousing	2,479	2.3%
14	Construction	2,196	2.0%
15	Manufacturing	1,995	1.8%
16	Real Estate and Rental and Leasing	1,703	1.6%
17	Utilities	1,497	1.4%
18	Retail Trade	1,338	1.2%
19	Mining, Quarrying, and Oil and Gas Extraction	38	0.0%
20	Agriculture, Forestry, Fishing and Hunting	2	0.0%
	TOTAL	**109,589**	**100.0%**

Source: U.S. Census Bureau, "OnTheMap," 2014 data, with adjustments made for Cuyahoga Community College. US Postal Service workers are excluded from the data.

Table 21. Jobs by NAICS Industry Sector, 2014 – University Circle (and Midtown between E. 83 St. and E. 105 St.)

Rank	NAICS Industry Sector	Count	Share
1	Health Care and Social Assistance	43,624	78.7%
2	Educational Services	6,310	11.4%
3	Accommodation and Food Services	2,086	3.8%
4	Arts, Entertainment and Recreation	1,223	2.2%
5	Professional, Scientific and Technical Services	549	1.0%
6	Administration & Support, Waste Management and Remediation	417	0.8%
7	Other Services (excluding Public Administration)	379	0.7%
8	Real Estate and Rental and Leasing	176	0.3%
9	Retail Trade	148	0.3%
10	Finance and Insurance	145	0.3%
11	Information	113	0.2%
12	Public Administration	100	0.2%
13	Manufacturing	79	0.1%
14	Management of Companies and Enterprises	58	0.1%
15	Utilities	32	0.1%
16	Wholesale Trade	14	0.0%
17	Transportation and Warehousing	7	0.0%
18	Mining, Quarrying, and Oil and Gas Extraction	3	0.0%
19	Construction	2	0.0%
20	Agriculture, Forestry, Fishing and Hunting	0	0.0%
	TOTAL	**55,465**	**100.0%**

Source: U.S. Census Bureau, "OnTheMap," 2014 data

Table 22. Jobs by NAICS Industry Sector, 2014 – Solon Cochran Corridor

Rank	NAICS Industry Sector	Count	Share
1	Manufacturing	9,448	42.2%
2	Wholesale Trade	3,661	16.4%
3	Professional, Scientific and Technical Services	2,132	9.5%
4	Administration & Support, Waste Management and Remediation	1,396	6.2%
5	Management of Companies and Enterprises	1,054	4.7%
6	Retail Trade	1,025	4.6%
7	Accommodation and Food Services	992	4.4%
8	Construction	624	2.8%
9	Health Care and Social Assistance	480	2.1%
10	Finance and Insurance	401	1.8%
11	Information	381	1.7%
12	Real Estate and Rental and Leasing	305	1.4%
13	Other Services (excluding Public Administration)	177	0.8%
14	Transportation and Warehousing	151	0.7%
15	Educational Services	57	0.3%
16	Utilities	49	0.2%
17	Arts, Entertainment and Recreation	26	0.1%
18	Mining, Quarrying, and Oil and Gas Extraction	11	0.0%
19	Agriculture, Forestry, Fishing and Hunting	6	0.0%
20	Public Administration	4	0.0%
	TOTAL	**22,380**	**100.0%**

Source: U.S. Census Bureau, "OnTheMap," 2014 data

Table 23. Jobs by NAICS Industry Sector, 2014 – Chagrin Highlands

Rank	NAICS Industry Sector	Count	Share
1	Health Care and Social Assistance	3,902	19.0%
2	Accommodation and Food Services	2,912	14.2%
3	Administration & Support, Waste Management and Remediation	2,171	10.6%
4	Professional, Scientific and Technical Services	1,857	9.0%
5	Retail Trade	1,472	7.2%
6	Finance and Insurance	1,339	6.5%
7	Real Estate and Rental and Leasing	1,240	6.0%
8	Management of Companies and Enterprises	1,895	9.2%
9	Wholesale Trade	916	4.5%
10	Other Services (excluding Public Administration)	682	3.3%
11	Information	449	2.2%
12	Manufacturing	435	2.1%
13	Transportation and Warehousing	262	1.3%
14	Arts, Entertainment and Recreation	214	1.0%
15	Educational Services	675	3.3%
16	Public Administration	58	0.3%
17	Construction	56	0.3%
18	Utilities	6	0.0%
19	Agriculture, Forestry, Fishing and Hunting	0	0.0%
20	Mining, Quarrying, and Oil and Gas Extraction	0	0.0%
	TOTAL	**20,541**	**100.0%**

Source: U.S. Census Bureau, "OnTheMap," 2014 data

Table 24. Jobs by NAICS Industry Sector, 2014 – I-77 & Rockside Area

Rank	NAICS Industry Sector	Count	Share
1	Administration & Support, Waste Management and Remediation	8,993	46.8%
2	Accommodation and Food Services	1,983	10.3%
3	Finance and Insurance	1,884	9.8%
4	Professional, Scientific and Technical Services	1,873	9.7%
5	Management of Companies and Enterprises	945	4.9%
6	Health Care and Social Assistance	908	4.7%
7	Wholesale Trade	602	3.1%
8	Information	549	2.9%
9	Retail Trade	289	1.5%
10	Transportation and Warehousing	281	1.5%
11	Real Estate and Rental and Leasing	277	1.4%
12	Manufacturing	210	1.1%
13	Other Services (excluding Public Administration)	207	1.1%
14	Educational Services	91	0.5%
15	Public Administration	57	0.3%
16	Construction	48	0.2%
17	Arts, Entertainment and Recreation	25	0.1%
18	Agriculture, Forestry, Fishing and Hunting	0	0.0%
19	Mining, Quarrying, and Oil and Gas Extraction	0	0.0%
20	Utilities	0	0.0%
	TOTAL	**19,222**	**100.0%**

Source: U.S. Census Bureau, "OnTheMap," 2014 data

Table 25. Jobs by NAICS Industry Sector, 2014 – Hopkins Airport Area

Rank	NAICS Industry Sector	Count	Share
1	Transportation and Warehousing	5,591	30.9%
2	Manufacturing	3,195	17.7%
3	Public Administration	2,026	11.2%
4	Professional, Scientific and Technical Services	1,250	6.9%
5	Wholesale Trade	1,031	5.7%
6	Real Estate and Rental and Leasing	774	4.3%
7	Accommodation and Food Services	739	4.1%
8	Construction	624	3.5%
9	Finance and Insurance	617	3.4%
10	Administration & Support, Waste Management and Remediation	574	3.2%
11	Arts, Entertainment and Recreation	460	2.5%
12	Other Services (excluding Public Administration)	396	2.2%
13	Retail Trade	355	2.0%
14	Health Care and Social Assistance	333	1.8%
15	Information	72	0.4%
16	Educational Services	19	0.1%
17	Management of Companies and Enterprises	13	0.1%
18	Utilities	2	0.0%
19	Mining, Quarrying, and Oil and Gas Extraction	1	0.0%
20	Agriculture, Forestry, Fishing and Hunting	0	0.0%
	TOTAL	**18,072**	**100.0%**

Source: U.S. Census Bureau, "OnTheMap," 2014 data

Conclusion

Jobs and the residences of employees who work at those jobs are scattered throughout the region, as the hubs represent only 23% of all Cleveland MSA jobs, and no one community is home to the majority of workers. The top city of residence for each hub is the City of Cleveland, which captures between 9% and 22% of all workers, depending on the employment hub. Despite the dispersion of jobs and residents, however, there appears to be strength in agglomeration. While overall MSA employment decreased by 34,000 jobs, or -3.3%, between 2004 and 2014, employment in the six hubs increased by 9,300 jobs, or 4.3%, during the same period.

Within the hubs, two employment sectors, “Arts, Entertainment, and Recreation” and “Professional, Scientific, and Technical Services,” had a proportion of employment that was almost double that of the region as a whole. Sectors with a greater share of employment represent strength and opportunities for an area; hence these sectors and hubs should be examined for their ability to leverage regional economic growth. Additionally, strong industry sectors, identified as “growth” sectors, should be fostered and supported for further economic growth. As an example, the “eds and meds,” which make up 90% of the employment in University Circle, led overall employment in that hub to grow 46% between 2004 and 2014, making it the fastest-growing employment hub in Greater Cleveland.

With respect to mobility, the U.S. Census Bureau estimates that more than 90,000 households in the Cleveland MSA do not have cars. Despite the need for public transit, however, connecting residential and employment locations with sufficient frequency when both are so widely distributed in the region is difficult. A future study, however, may examine the feasibility of connecting transit-dependent neighborhoods to select employment hubs, directly or through an intermediate transit hub. Another approach or solution may be to encourage new jobs at existing employment centers that are already, or easily can be, served by mass transit connecting to a broad geographic area. Finally, further examination of employment in each hub by industry sector and the demographic characteristics of its workers may lead to more robust conclusions about the transportation needs for each hub, and about job access in the region as a whole.