

NORTH SHORE TRANSIT SERVICE COORDINATION PLAN

Market Analysis Briefing Book

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NYGAARD

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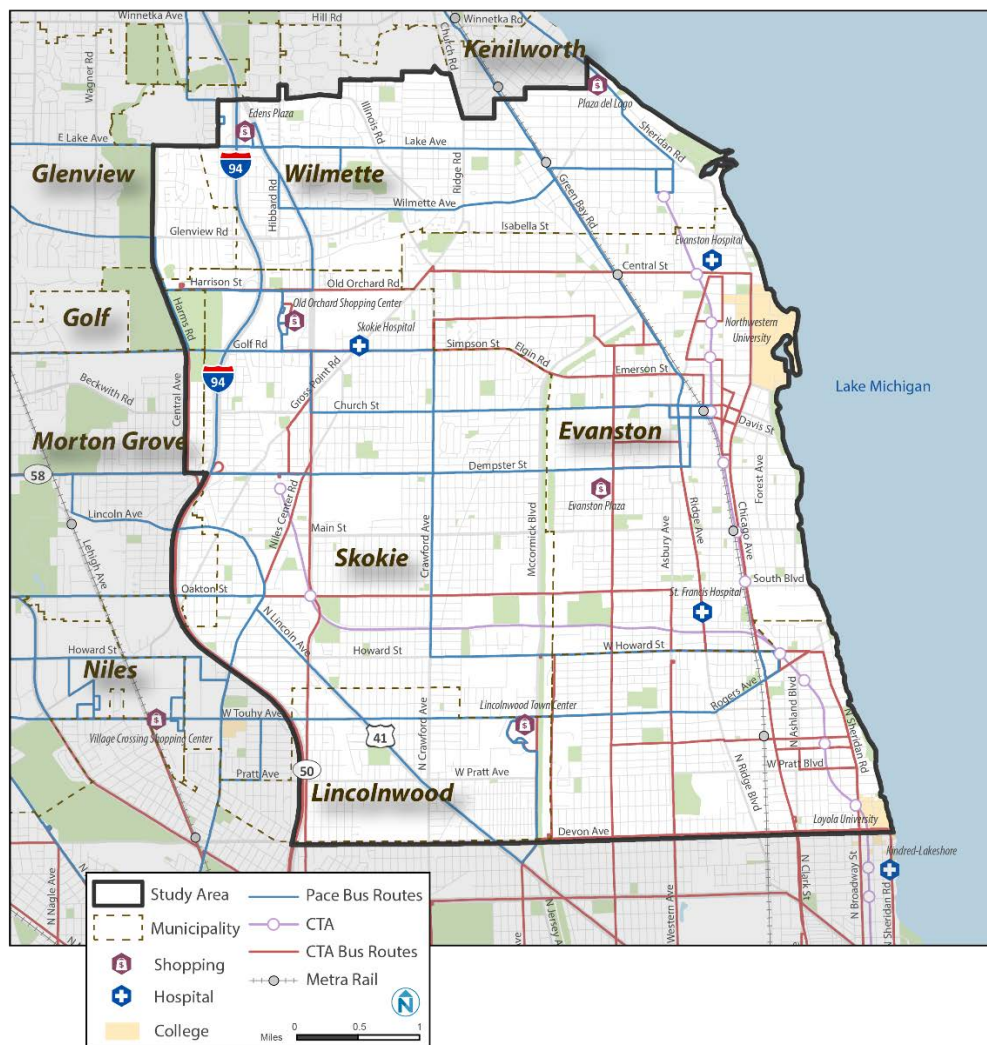
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1 INTRODUCTION

This briefing book presents market analysis and travel conditions findings to date of the North Shore Transit Service Coordination Plan. The goal of this plan is to identify opportunities to improve coordination between Pace and CTA bus service in a manner that is consistent with local planning efforts and supported by local stakeholders. Close coordination of bus service offerings between the two agencies has the potential to reduce operating cost, but more importantly will improve mobility for current and future transit passengers.

Figure 1-1 North Shore Study Area



What's Included

This briefing book presents key findings to date of the North Shore Transit Service Coordination Plan. In order to determine how transit can best meet the needs of people who live and/or work in the North Shore area, the first part of this project was to assess the following:

- **Demographics and Travel Patterns.** Using Census and regional travel-demand data, the project team analyzed populations that live, work, and/or travel through the North Shore.
- **Rider and General Public Feedback.** The project team surveyed a total of 1,463 riders to better understand rider demographics, customer opinion, trip purpose, and travel patterns. In addition, 1,090 members of the general public (including riders and non-riders) were surveyed to help identify the market potential for attracting new riders within the study area. The findings from both surveys inform recommendations to improve service for both current and potential riders.
- **The State of Transit Service.** The project team analyzed different components of service among Pace and CTA bus routes that operate within the North Shore. These measures include overall ridership, transfers, productivity (e.g., the number of people riding compared with hours of service), and on-time performance.

What's Next

The next phase of the project will be to plan service in coordination with developments in the community to better serve current and future bus riders. The first chapter of this briefing book—Key Findings and Recommendations—highlights key findings from the analysis and presents recommendations that will inform the service planning phase of this project.

2 KEY FINDINGS AND RECOMMENDATIONS

As stated in the introduction, the purpose of this plan is to improve the coordination of CTA and Pace services in the North Shore. The goal of the market analysis is to better understand existing travel demands and transit markets. Going forward, the goal is to leverage changes in transit investments to better serve current and future bus riders in the area. This chapter highlights key findings and recommendations that will inform those efforts.

Prioritization of Recommendations

Each recommendation has an order of priority of high, moderate, or low. The criteria that inform the priority rankings are summarized in the table below. It should be noted that recommendations do not need to meet every criteria of a priority ranking. Rather, the criteria serve as general guidelines to help determine overall priority for a given recommendation.

Figure 2-1 Criteria for Ranking Recommendations

Priority	Criteria
High	<ul style="list-style-type: none">• Good opportunity to improve ridership, access, and/or productivity• Requires no new funds (but maybe a reallocation of resources)• Short-term implementation (less than five years)
Moderate	<ul style="list-style-type: none">• Likely to improve ridership and productivity, but results less certain• Requires additional resources• Medium to long-term implementation (more than five years)• Suited to meet travel demand and/or rider preferences
Low	<ul style="list-style-type: none">• Potential ridership and productivity results are speculative• Requires significant new resources• Longer-term implementation (more than 10 years)• Shows up in market and demand analysis as a potential ridership generator

The priorities assigned to the recommendations below are to ensure that the upcoming service planning effort will focus on the most important findings from the project to date. Following the action items are links to supporting maps, tables, and from the body of the report.

Finding #1: Ridership is focused in a few high-demand areas.

The most intense ridership is related to a few areas within the study area that are characterized by higher densities, greater levels of activity, more intense transit propensity, and higher levels of transit service.

Recommended Actions

- Focus service improvements in areas and corridors with higher densities, higher activity levels and significant transit propensity. **Priority: Moderate**

What Supports This Finding?

- Ridership and transit propensity (Figure 7-2)
- Service headways and transit propensity (Figure 7-23)
- Service headways and ridership (Figure 7-24)

Finding #2: Current riders are most concerned about frequency and reliable connections.

When comparing overall rider satisfaction and satisfaction with specific certain characteristics, we can see which characteristics, if improved, are most likely to improve overall satisfaction. The findings from this method show what parts of service are most important to current riders, described below:

- Bus-rail transfer reliability ranked highest in importance among surveyed riders, which is unsurprising given that over one-half of bus riders transfer and nearly 25% of them reported a transfer to or from CTA rail.
- Speed and on-time performance also ranked as highly important among riders
- Improving weekday midday frequency and adding later service hours are moderately important in improving rider satisfaction.

Recommended Actions:

- Review bus to CTA rail connections and reliability or ensure these are major considerations in route or schedule changes. **Priority: High**
- Review on-time performance on heavily travelled routes to identify corridor improvements to increase speed and reliability. **Priority: High**
- Improve service frequency in high demand corridors. **Priority: Moderate**

What Supports This Finding?

- Importance vs. performance for service attributes (Figure 5-1)

Finding #3: Opportunities exist to improve ridership among current riders.

- Most frequent riders only ride for work purposes.
- The demographics of the frequent riders, (young, diverse, lower income, working, more likely to not own a car) match well with the nationally developed profile of riders (TransitCenter, 2016) who are more likely to use transit for all trip purposes. In the North Shore study area bus riders ages 18 to 40 are the largest group of riders who ride for work at 61% of all work trips, yet are just over 50% of the general population and make up only 30% of all riders.
- Current service offers access to many non-work destinations and activity centers as demonstrated in the rider origin–destinations and the overall ridership patterns.
- Aside from the “multi-purpose” demographic cohort described above, many current rider households are zero-car households suggesting travel demand to non-work destinations can be met through transit.

Recommended Actions:

- Consider expanding night and weekend service where there are clusters of non-work destinations. **Priority: Low**
- Consider expansion of frequency on weekday midday routes that serve very active weekday daytime activity centers. **Priority: Moderate**

What Supports This Finding?

- *Pace/CTA On Board Survey, Section 5*

Finding #4: Opportunities exist to increase ridership among infrequent and non-riders.

- Top service improvements from survey participants who are infrequent or non-riders:
 - Frequency
 - Service to more places
 - Reliability
 - Morning and evening hours
- When asked what would get them to ride more, occasional riders and non-riders are more likely to choose service improvements that enhance travel within the North Shore area over travel to downtown Chicago via CTA or Metra rail. This preference is likely due to a higher satisfaction with the intensity of service to downtown Chicago than local bus service.
- Occasional riders and non-riders in Evanston, Skokie, and Chicago (within the bounds of the study area) cited frequency and coverage as top reasons they do not ride more often. In Lincolnwood, 54% of respondents listed coverage as the best way to get them to ride more often.¹

Recommended Actions:

- Consider improvements to areas and corridors where there are strong existing transit markets that are underserved, (frequency, directness, travel time) where improvements to the service might attract both improved ridership from current riders and attract less frequent and non-riders. **Priority: High**
- Investigate parts of the service area where there is currently no, or very limited, service to determine if there is a likelihood of attracting a sustainable level of transit ridership. **Priority: Low**

What Supports This Finding?

- *General Public Survey, Section 6*

¹ During early public outreach efforts, residents of Lincolnwood, in-person and through a petition, promoted this idea with a specific proposal to extend coverage on Devon Avenue to the Edgebrook Metra Station. This is one of the ideas that will be further explored in the service planning phase of the study.

Finding #5: Opportunities exist to focus resources to improve service for more riders.

- There are areas and time periods of low to very low transit productivity in the study area where there is little or no ridership. These areas may indicate an opportunity to reallocate service to areas and/or time periods that can generate more ridership with the same service.
- There are a few areas where transit resources are duplicative or competing (i.e., where lines are on the same street or close together), or areas where the spacing between routes may not be appropriate compared with the population/employment density of the surrounding area. While some of these may be justified, there may also be options to reduce redundancy and direct those resources to areas where ridership can be increased.
- There are opportunities to meet latent demand on certain routes when productivity is relatively high outside of peak times.

Recommended Actions:

- Explore opportunities to reallocate resources from areas of low productivity to areas where it could better serve the community. When applicable, apply existing guidelines to identify areas of low productivity that do not meet adopted guidance – examples: established definitions of low productivity that define minimum thresholds for service retention. **Priority: High**
- Explore opportunities to combine routes where there is duplication or coverage is very close. For example, East-West routes between Dempster and Central from Crawford to Green Bay Road are potentially too closely spaced based on the demand. Route spacing in this area ranges from $\frac{1}{4}$ to $\frac{1}{2}$ mile while many other areas with heavier density and higher demand have route spacing of up to one mile. **Priority: High**
- Explore opportunities to reallocate resources from routes that are only productive during certain time periods by focusing on what generates the most ridership. For example, on routes where most ridership comes from a high school, explore opportunities to maintain service during school travel hours and reducing service during less productive times. **Priority: High**
- Consider areas where fixed-route service is not productive for alternative service that may serve the area more efficiently, e.g., Pace's Call-n-Ride service model. **Priority: Moderate**
- Consider adding service (improved headways, increased span, etc.) when routes show potential to meet latent demand during off-peak and/or non-weekday service. **Priority: Moderate**

What Supports This Finding?

- Pace and CTA Weekday Ridership (Figure 7-1)
- *Productivity by Route*, Section 7
- *Service Span*, Section 7
- *Frequency and Coverage Compared to Transit Markets*, Section 7

Finding #6: There are significant work trip pairs where there is a large difference between all work trips and transit work trips.

Comparing commute patterns between the region's overall population and bus riders shows opportunities where bus service may better meet the commuting needs of current and future riders. In a perfect world, the two maps (shown side-by-side below) would mirror each other, indicating that transit service allows bus riders to take the same trips as commuting motorists. However, while the two populations share some trip patterns, there are also some stark differences, described below.

- Bus riders' work and school trips are less downtown (Chicago) oriented than general public survey participants. This does not mean that downtown Chicago is poorly served. It is important to recall the comparison is between bus riders and the general public. If people who exclusively use CTA Rail or Metra were also included in the comparison, the contrast would be less profound. While not necessarily a fully representative pattern, the general public survey commute patterns come much closer to mirroring the work trip patterns with respect to downtown Chicago, being that they contain a higher percentage of people who only ride CTA Rail or Metra for work trips.
- Jefferson Park/Irving Park to Skokie – more than 5,000 work trips per day are found between this pair in the regional travel data, yet it does not represent a major trip pattern among surveyed riders. There are any number of possible reasons for this differential. The question is, does it represent an opportunity to improve transit access and ridership?
- Niles North/Park Ridge to Skokie – similar to the pattern noted with respect to Jefferson Park there is a substantial difference in this pair comparing bus riders to the general population.
- Deerfield/Highland Park to Skokie – This is a longer distance commute and somewhat less significant than the first two trip pairs, but still show as a market for further consideration.

Figure 2-2 Regional Home-Based Work Trips (All Modes)

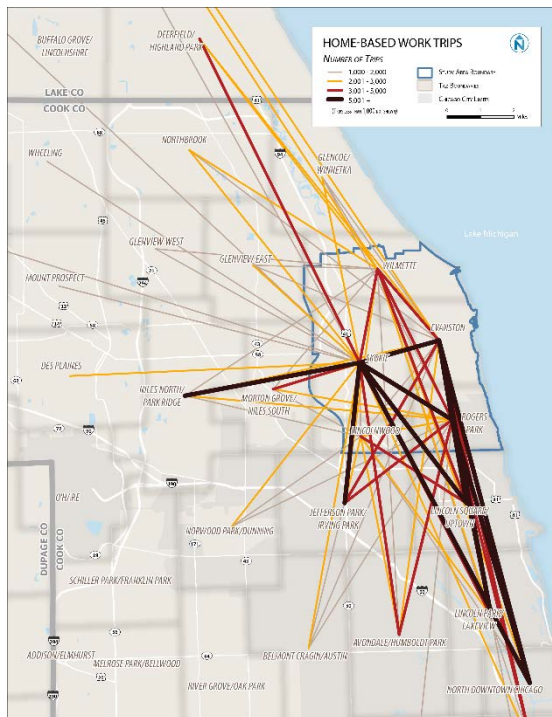
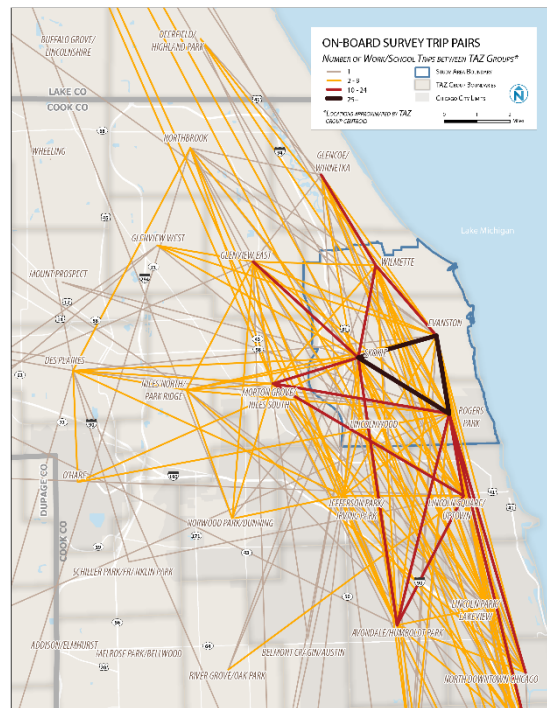


Figure 2-3 Bus Rider Commute Tips



Recommended Actions:

- Explore the work trip patterns where transit trips appear to be under-represented (as above) to ascertain if enhanced transit access or service could attract a larger share of the travel market. **Priority: Moderate**
- Further explore bus rider connectivity to downtown Chicago. Given the number of people who make this trip on transit without using the bus, there may be an opportunity to attract some of those riders to a bus-rail trip rather than a park and ride to rail trip. **Priority: Moderate**

What Supports This Finding?

- Regional population commute patterns (Figure 4-1)
- Bus rider commute patterns (Figure 6-2)
- General public survey commuter patterns (Figure 6-4)

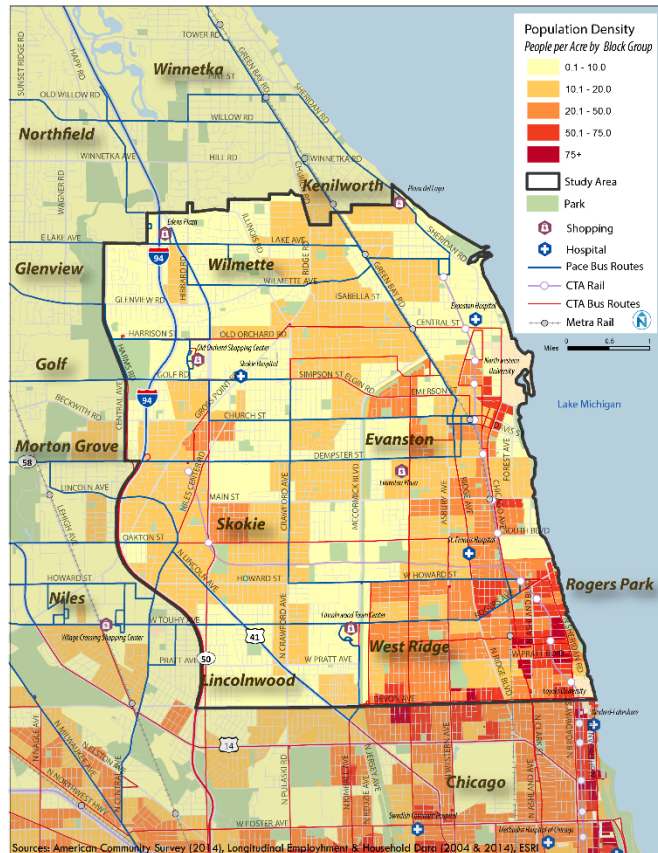
3 STUDY AREA DEMOGRAPHICS

Demographics help us understand the characteristics and locations of people who are more likely to ride transit. Two important factors are concentrations of population and employment.

Population and employment densities influence transit usage rather directly; the more people there are living in an area or attracted to an area, there is an increased probability that a greater number of them will use transit. Aside from simple concentrations of people and economic activity, socio-economic factors such as income, automobile access, age, physical disabilities, and rental housing can also affect an area's demand for transit services. Figures 3-1 through 3-10 show key findings from a demographic assessment of the North Shore study area.

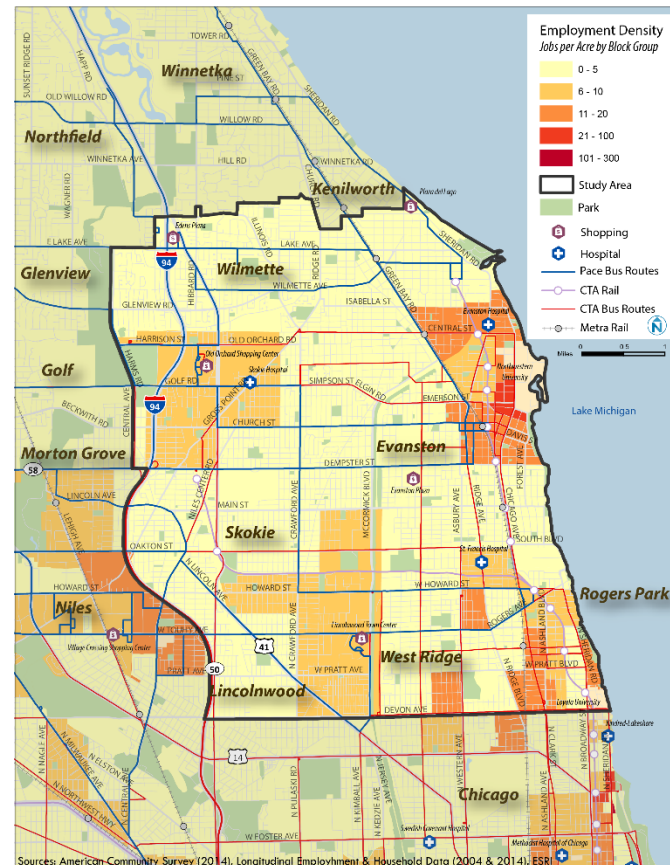
Population densities within the study area are highest in the eastern half, most notably in Rogers Park and Evanston, centered along the Chicago Avenue, Clark Street, and Devon corridors. Population of the entire study area is about 276,513.

Figure 3-1 Population Density



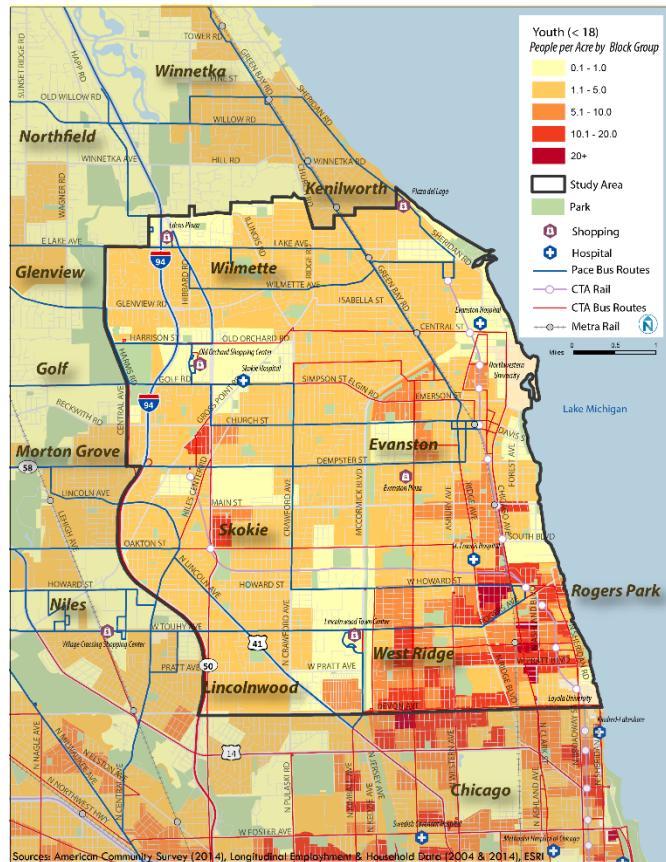
Employment density is highest in clusters around Northwestern University, in Rogers Park, and just to the west of the study area in Niles. Jobs in the entire study area are about 110,802.

Figure 3-2 Employment Density



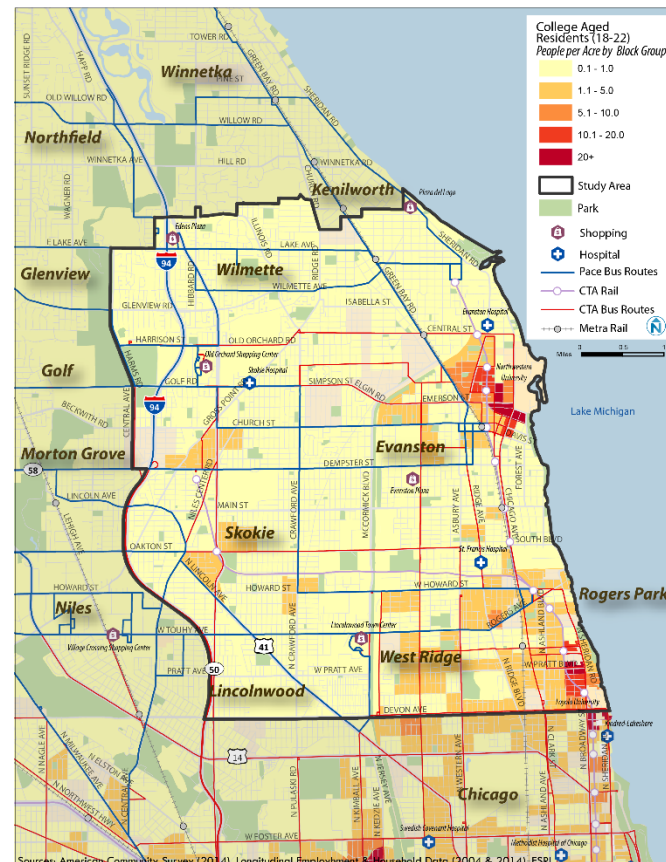
Youth densities (under the age of 18) within the study area are particularly high in the southeastern part of the study area, especially in Rogers Park and West Ridge. There are also notable pockets around Skokie and Evanston.

Figure 3-3 Youth (<18)



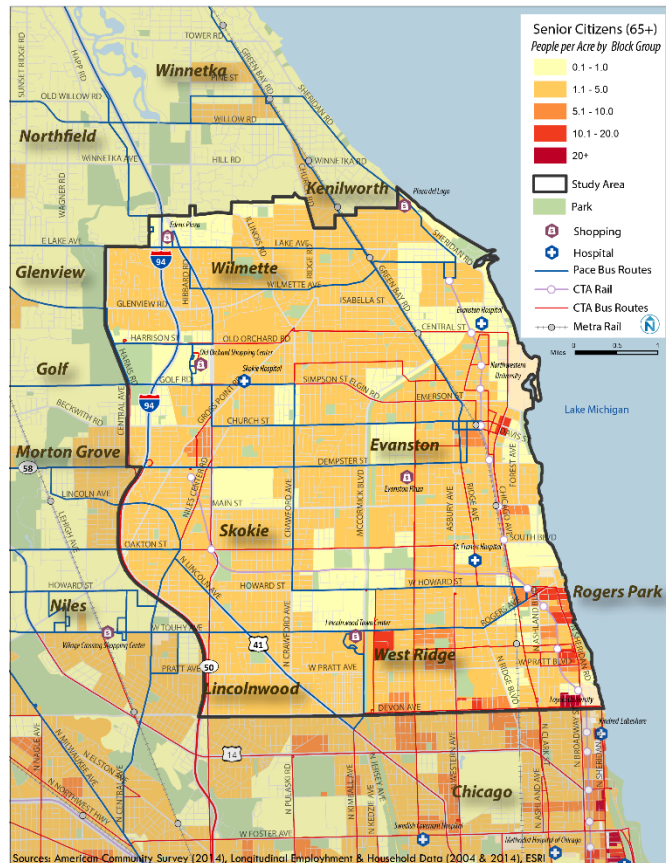
College-age residents, as might be expected, have the most notable presence around Northwestern University and Loyola University. West Ridge and the northern edge of Rogers Park are also home to a sizeable population of residents aged 18 to 22.

Figure 3-4 College-Aged Residents (18-22)



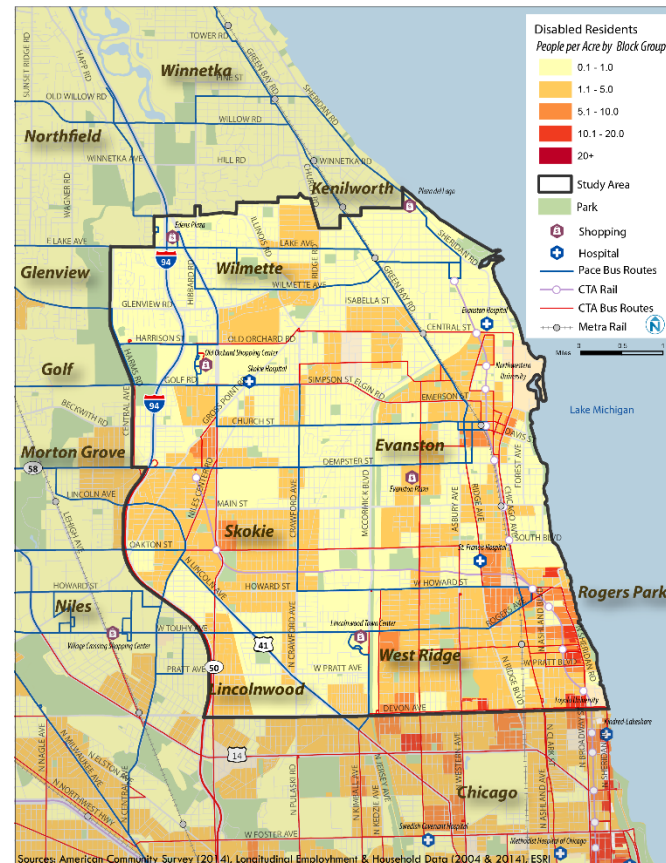
Senior population density (over the age of 65) is, for the most part, evenly dispersed across the study area with a few notable pockets along Lake Michigan. The block groups with the highest densities can be found in Evanston, West Ridge, and Rogers Park.

Figure 3-5 Senior Citizens (65+)



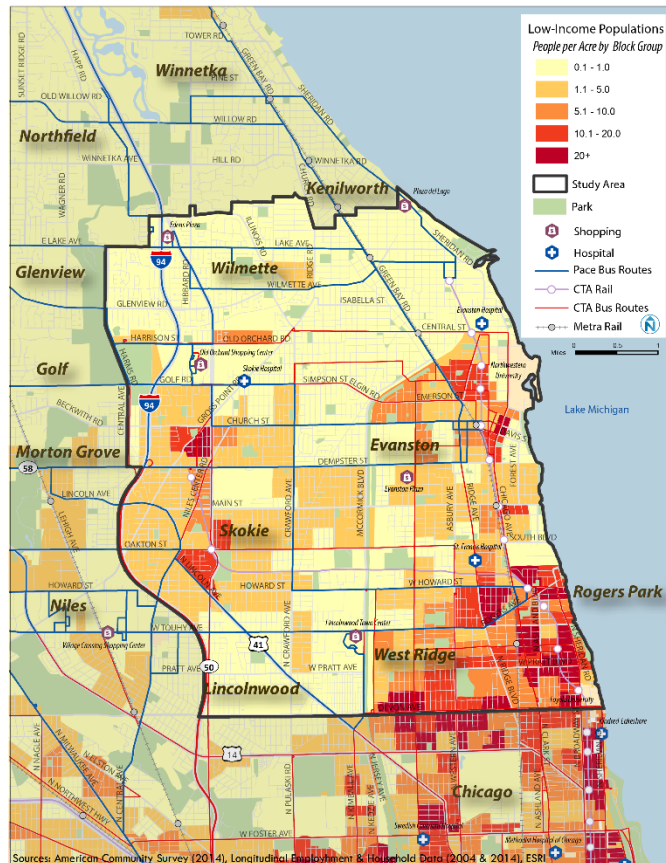
Among **residents with a disability**, the most notable pockets are on the Sheridan Avenue corridor (Rogers Park), on the Devon Avenue corridor (West Ridge and Rogers Park), on the Skokie Blvd. corridor, and near downtown Evanston.

Figure 3-6 Residents with a Disability



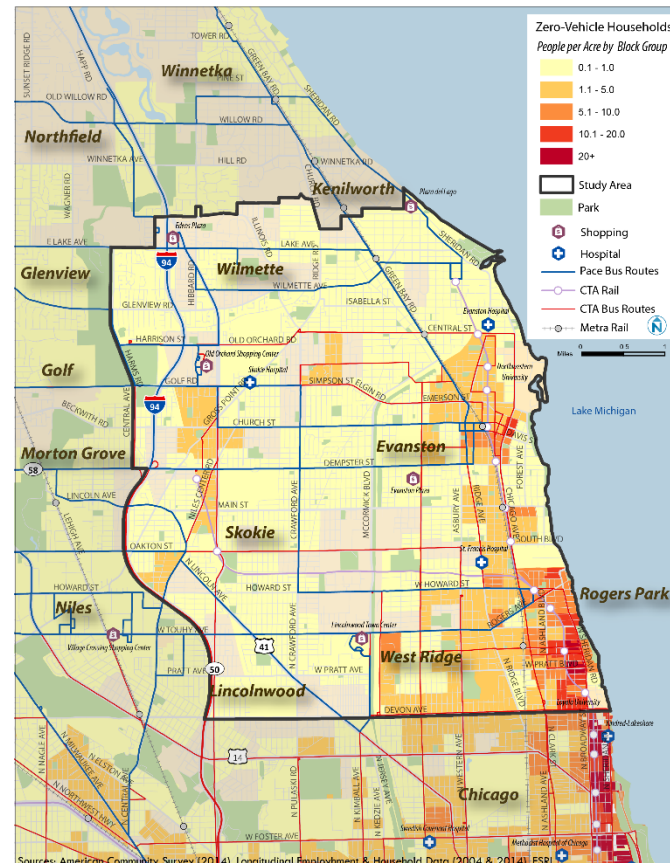
Low-income populations (at or below 150% of Census poverty threshold) densities are highest toward the southeast portion of the study area in Rogers Park and West Ridge.

Figure 3-7 Low-Income Populations



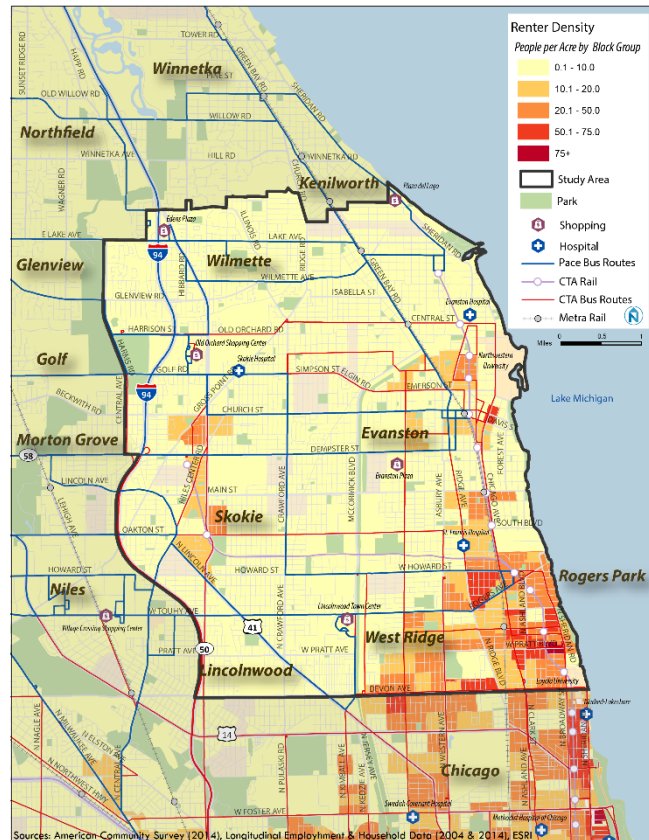
Households without access to a car have a strong presence along the eastern half of the study area, with the densest pockets in Rogers Park just west of Sheridan Road and in Evanston just south of Northwestern University.

Figure 3-8 Households Without Access to a Car



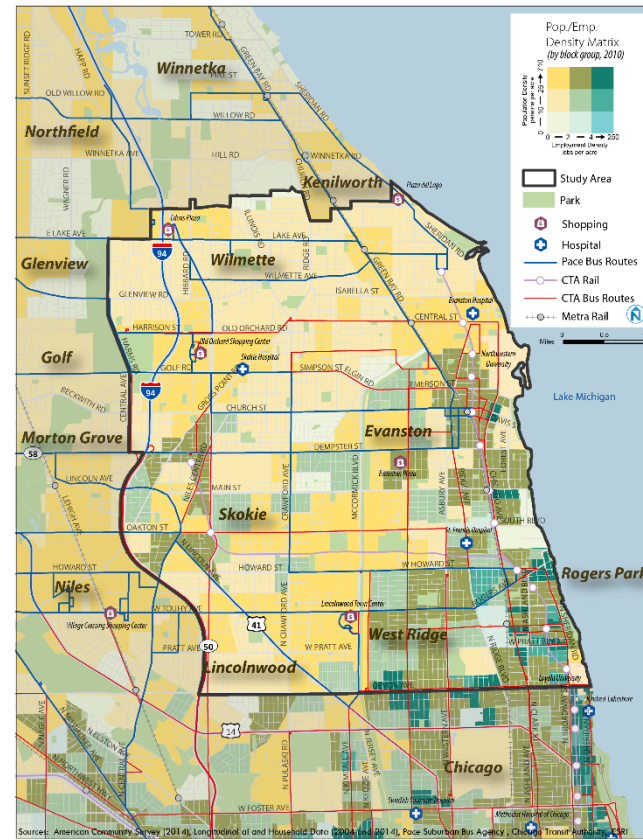
Densities of **people living in rental households** are highest in northern Chicago, especially in Rogers Park just north of Loyola University and in West Ridge just north of Devon Avenue.

Figure 3-9 Density of Renters



High population and employment densities, when taken together, are a good indicator of an area's need for transit service. The areas in Evanston and northern Chicago east of McCormick Boulevard and in Skokie between I-94 and Skokie Boulevard have the highest concentration of both employment and residences.

Figure 3-10 Population and Employment Density Matrix

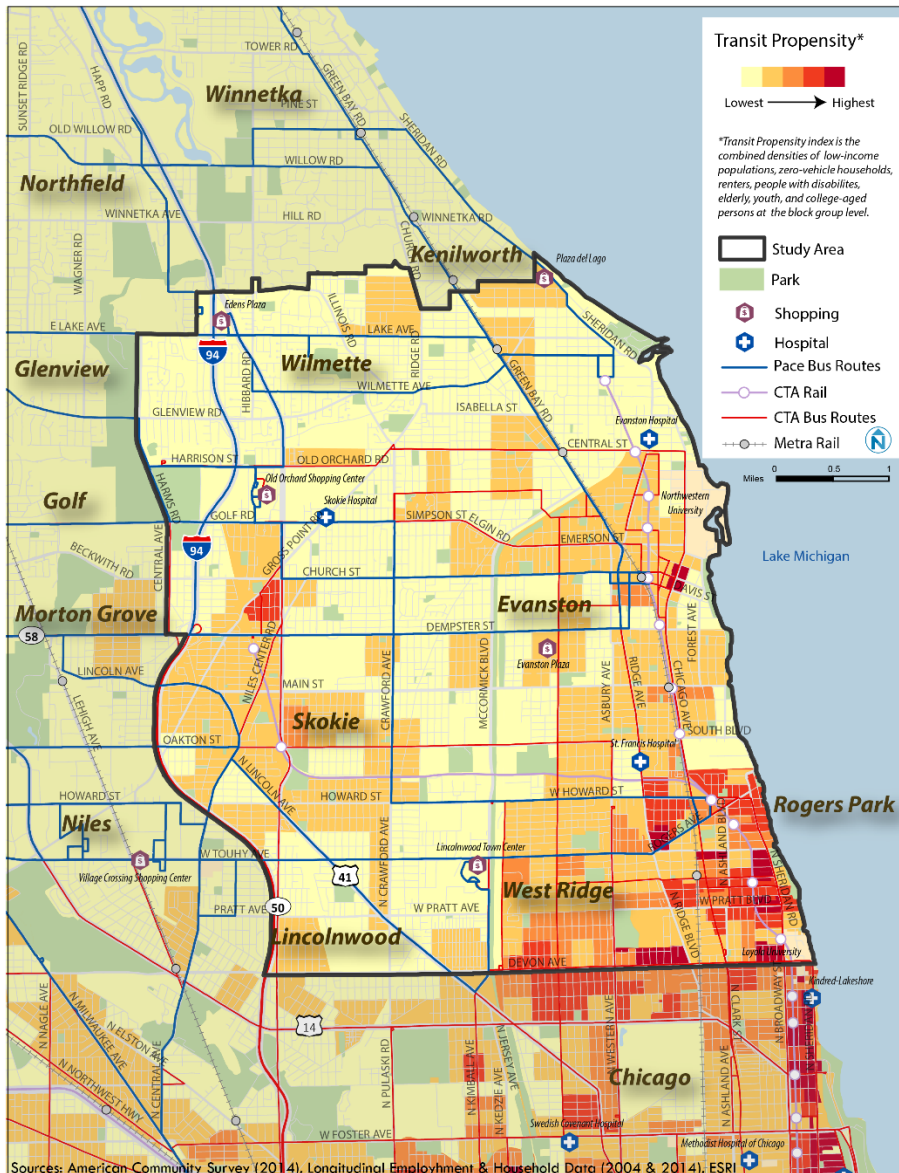


Transit Propensity

Transit propensity is an index measure that indicates where the highest ridership need is likely to occur based on demographics. For the North Shore study area, transit propensity is highest in the southeastern corner (in Rogers Park and West Ridge) and in Evanston, especially in the neighborhoods adjacent to Northwestern University. There are also visible pockets along the Skokie Boulevard corridor.

In order to estimate transit propensity in the North Shore study area, the densities of seven different demographic indicators including youth, college students, seniors, people with a disability, households without access to a car, people living in poverty, and renters were added together, assigned values, and grouped from very low to very high. Figure 3-11 shows how this index is distributed geographically in the North Shore study area.

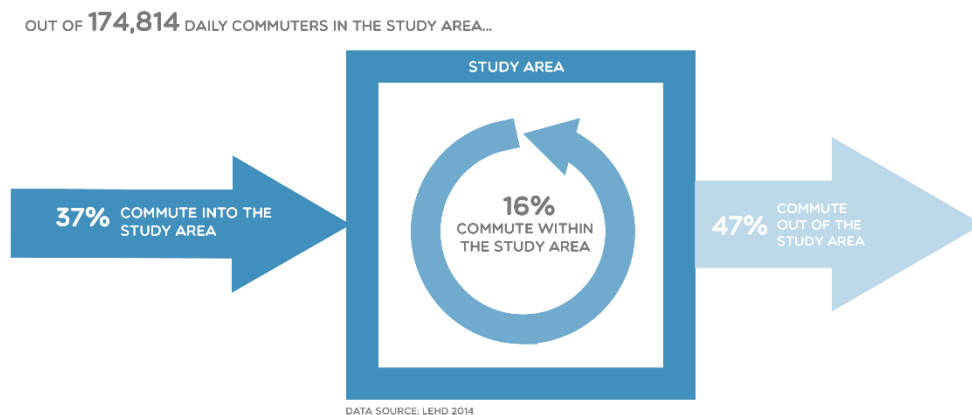
Figure 3-11 Transit Propensity Index



4 TRAVEL PATTERNS

An analysis of origin-destination travel demand was conducted to determine major travel patterns to, from, and within the North Shore study area. The analysis used trip tables from the Chicago Metropolitan Agency for Planning (CMAP) travel demand model for the year 2010 as well as 2014 Longitudinal Employer-Household Dynamics (LEHD) data from the U.S. Census. Several trip types were examined, including home-based work trips, non-home based trips, and home-based other trips. The analysis includes both automobile and transit trips.

By the Numbers



More people commute into or out of the study area (84%) than those who commute within it (16%).² According to the 2014 LEHD survey conducted by the U.S. Census, on an average day in the North Shore:

- 174,814 total work trips are generated from and attracted to the study area.
- An estimated 65,150 commuters live outside the study area and travel into the study area for work.
- An estimated 81,320 study area residents who live in the North Shore travel out of the study area to get to work.
- Another 28,344 commuters live and work within the boundaries of the study area. When combined with the 65,150 people who travel into the area for employment this means the daytime population of the study area is likely slightly higher than the residential population.

² U.S. LEHD, 2014

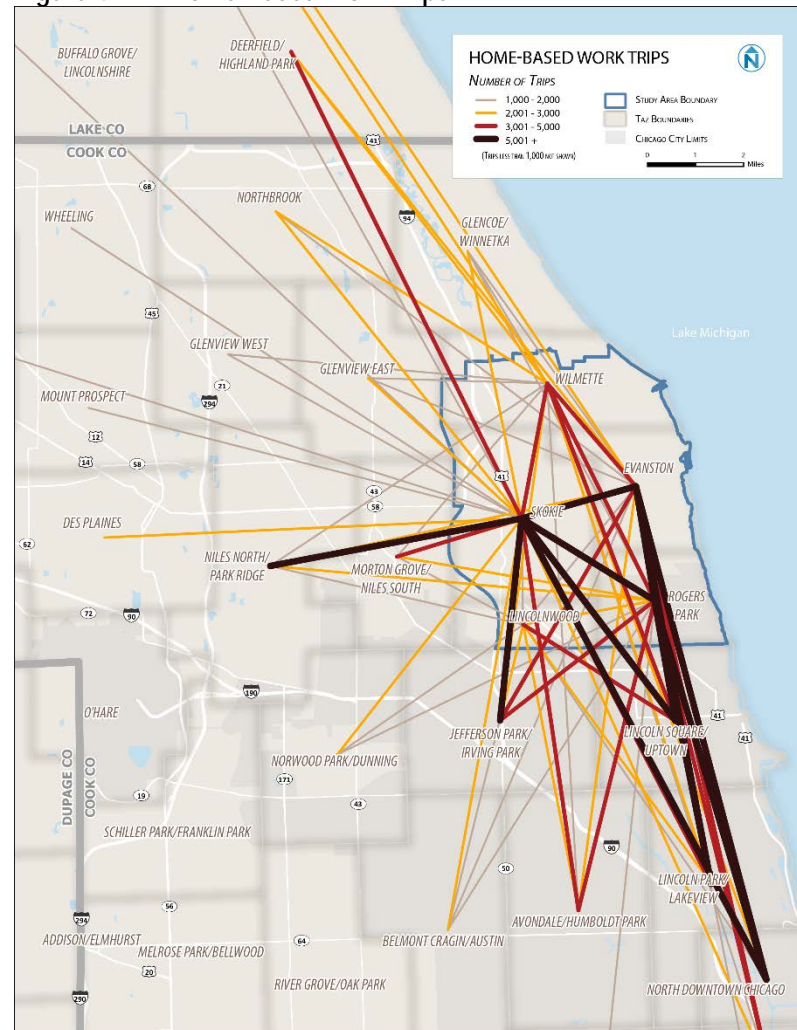
Home-Based Work Trips

The North Shore is a major employment center in the region, producing and attracting thousands of commute trips of short and long distances. Home-based work trips among people living or working in the study area are shown in Figure 4-1.

- Communities outside the study area that attract and generate the most trips are (in order): Downtown Chicago, Lincoln Square/Uptown, Lincoln Park/Lakeview, and Jefferson Park/Irving Park.
- Many people also commute between Evanston, Skokie, and Niles North/Park Ridge, and to a lesser extent between Skokie and Morton Grove/Niles South. These pairs are well served by transit, with several long east-west bus routes providing a one-seat ride between Evanston and Niles North/Park Ridge (Pace routes 208, 250, 290).
- The number of people commuting between Skokie, Evanston, and Rogers Park is also high, totaling over 5,000 home-based work trips daily. These origin-destination pairs are well served by transit, with multiple Pace and CTA bus routes serving the area as well as CTA rail service between Rogers Park and Skokie, and Rogers Park and Evanston.

This map shows data from the 2010 CMAP regional travel demand model.

Figure 4-1 Home-Based Work Trips



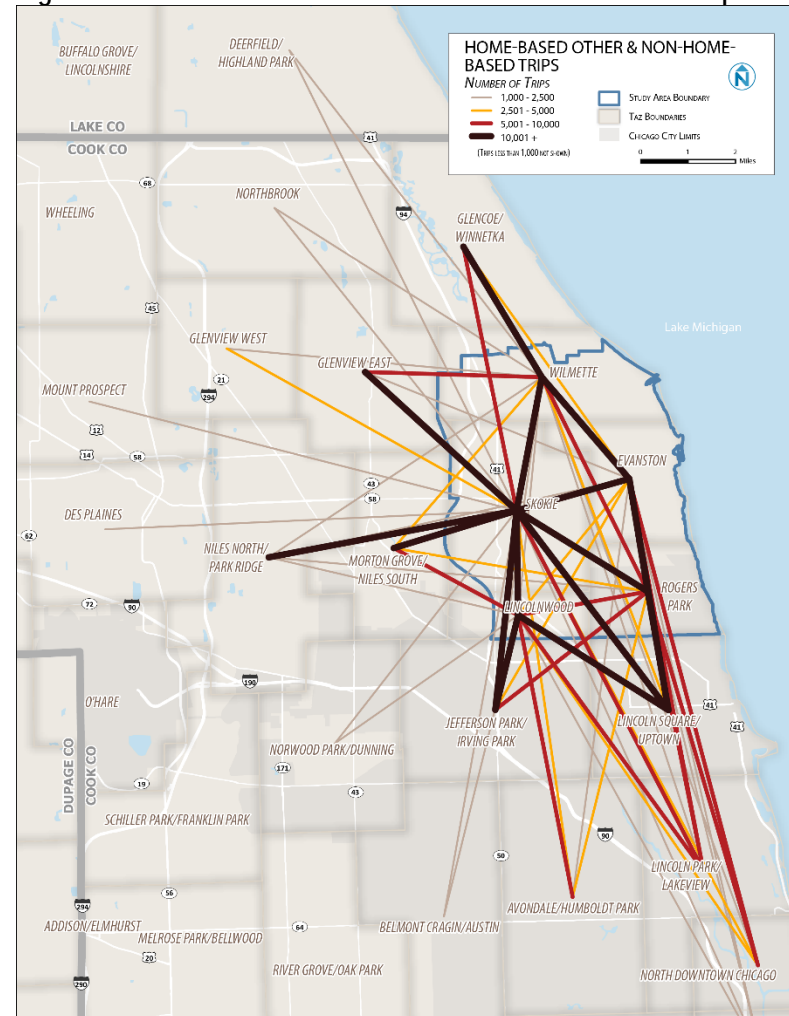
Home-Based Other and Non-Home-Based Trips

Non-work travel patterns in the study area, including home-based trips for purposes other than work and non-home-based trips, are displayed in Figure 4-2.

- The most significant travel patterns (more than 10,000 daily trips) are generally short distances between adjacent zones. These trips are served by Pace and CTA bus routes within the study area.
- There is also some longer distance north-south travel activity between the study area and Avondale/Humboldt Park, Lincoln Park/Lakeview, and North Downtown Chicago.

This map shows data from the 2010 CMAP regional travel demand model.

Figure 4-2 Home-Based Other and Non-Home-Based Trips

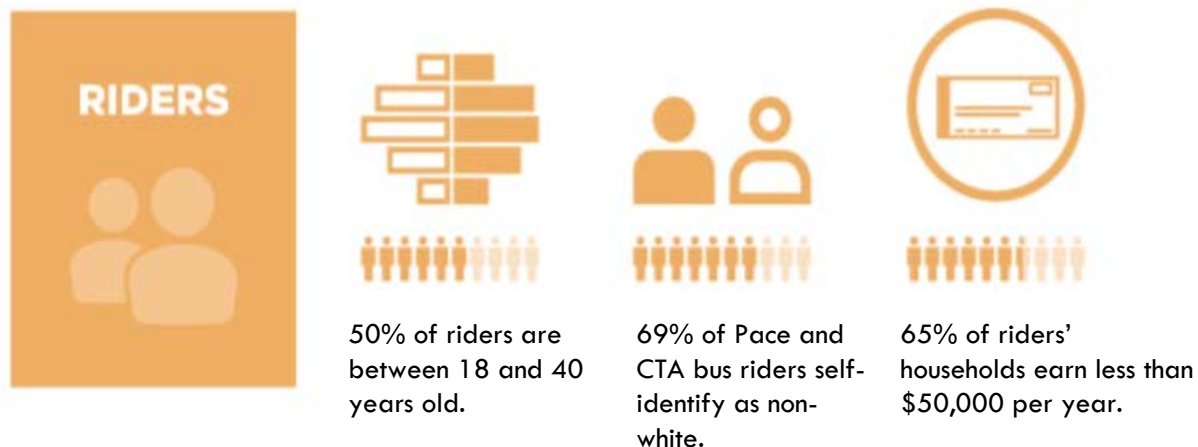


5 CURRENT BUS RIDER SURVEY

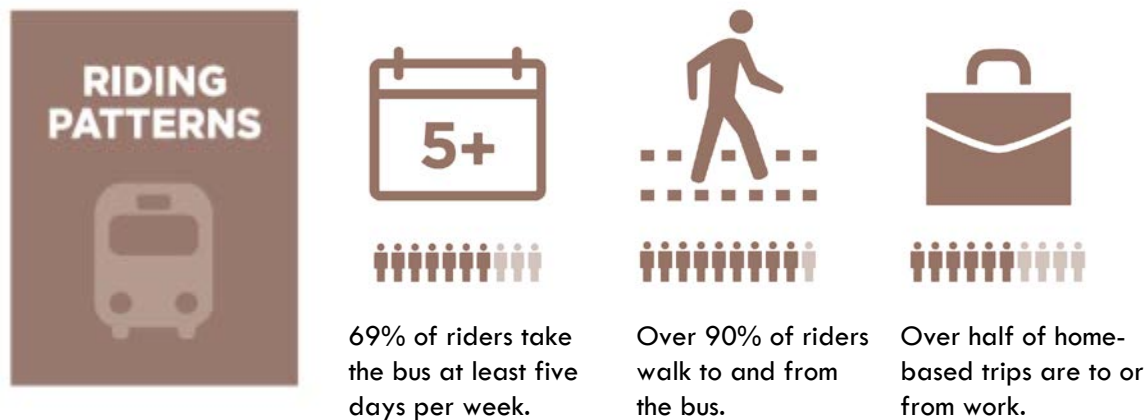
We asked Pace and CTA bus riders how they use bus services in the North Shore study area today— their riding patterns and transfers, reasons for riding, about themselves, and what improvements to bus service they want to see —what would make them ride more often, and what their preferences are. The following section summarize the findings of that on-board survey conducted in spring 2016. A total of 1,463 people responded to surveys on-board Pace and CTA bus routes in the study area.

Who are they?

Generally, bus riders are younger, more diverse, have lower household incomes, own fewer autos than the general population of the study area, and are travelling for work and school. Riders who occasionally use transit for non-work purposes are older, have higher incomes with a diversity profile that is similar to the study area community. Low-income, working passengers were the least likely among income groups to have a discounted transit pass.



Where are they going?



Bus riders' travel patterns are shown in the maps in Figure 6-2 and Figure 6-3. Bus riders' work and school trips are much less downtown (Chicago) oriented than the general public. Short trips within one area comprise nearly one-quarter of all trips. Important trip origins and destinations for transit riders include:

- Within Evanston
- Between Evanston and Rogers Park
- Between Skokie and Rogers Park
- Between Skokie and other areas outside the study area, such as Morton Grove/Niles South and Avondale/Humboldt Park
- Within Rogers Park

What are their transfer patterns?



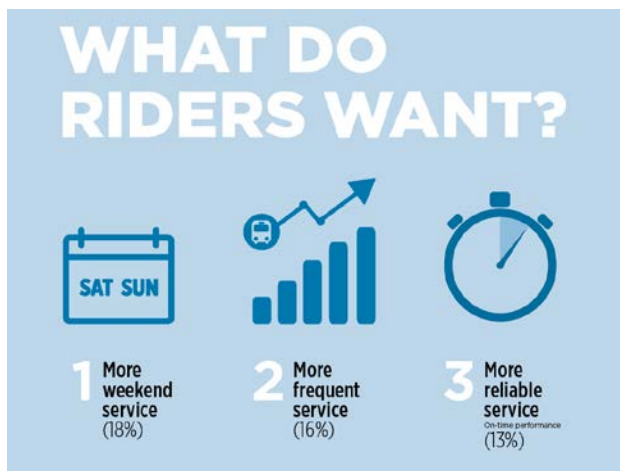
What are their reasons for riding?

Pace and CTA buses provide a valuable service to people without (or with limited access to) personal vehicles. Over two-thirds of bus riders cite not owning a car as a reason for using public transit. One-quarter cite the cost of driving or the cost of parking, followed by 17% who said they prefer taking transit.

An additional nine percent indicated that they own a car but that someone else in the household uses it.



What improvements do they want to see?



Bus riders are interested in seeing more weekend service, increased frequency, and better reliability.

Customer Satisfaction

We also looked at people's overall satisfaction with Pace and CTA bus service in the area based on which routes they ride and how frequently they take the bus. We found that:



Riders on Pace routes 422, 210, and 250 are most satisfied with service. Riders on CTA route 201 also ranked services as good on overall satisfaction rankings. Riders on CTA routes 54A and 93 reported the lowest overall satisfaction.³

As riders' overall satisfaction increases, the time they are willing to wait for a transfer gets longer.



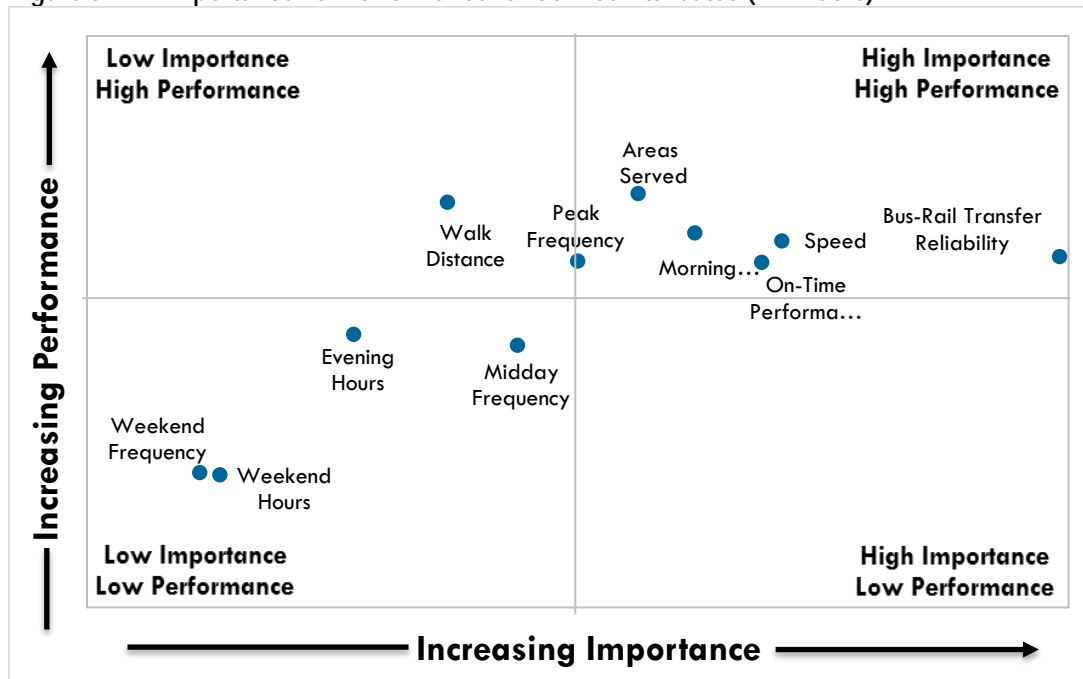
Occasional bus riders (taking transit once per week or less) are more likely than other bus riders to rank services as poor and less likely to rank services as good.

As part of the on-board survey of bus riders in the North Shore study area, we asked them about how satisfied they are with specific aspects of transit service (such as frequency, on-time performance, speed, and areas served). In addition to rating individual service attributes, those surveyed were also asked to rate their overall satisfaction with Pace and CTA bus service. These ranking were then subjected to further analysis to determine the level of importance to riders for each service attribute. This is to clarify not just the degree of satisfaction, but also how important an attribute might be to the rider. The level of importance was derived by assessing the correlation of each individual service attribute with their overall satisfaction ranking. By measuring the correlation of each attribute with overall satisfaction, we were able to rank service attributes in order of importance. For example, a customer may have rated walking distance as "Poor," yet still rated their overall satisfaction with transit service as "Excellent." This tells us that the person places less importance on walking distance. Even though they are relatively dissatisfied with that particular element of service, it plays only a minor role in their overall level of satisfaction with bus service in the study area.

Figure 5-1 illustrates the performance of specific service attributes or the level of satisfaction for that attribute, as they correlate to bus riders' overall satisfaction with bus service, or how "important" that factor is in determining their overall level of satisfaction.

³ Although survey results are statistically representative of bus transit riders in the study area, sample sizes may not be statistically representative for each route.

Figure 5-1 Importance vs. Performance for Service Attributes (All Riders)



Attributes in the high importance / high performance quadrant are items where Pace and CTA riders are most satisfied and that are highly correlated with riders' overall satisfaction, or the level of importance that factor plays in determining their overall level of satisfaction. Attributes in the low importance / low performance quadrant are items where riders have lower levels of satisfaction but those items also have low correlation to riders' overall level of satisfaction. In other words improving on those factors would have a lessor influence on improving the overall level of satisfaction. For example, Pace and CTA could deploy a strategy to substantially improve weekend service in both hours and frequency, only to find that the improvements, once implemented, play only a small role in increasing overall rider satisfaction.

Key findings from the performance/importance assessment are:

- Riders feel that Pace and CTA are performing well on several of their highest valued transit service attributes: **bus-rail transfer reliability, speed, on-time performance, morning operating hours, and areas served**. Bus-rail transfer reliability, speed, and on-time performance have performance rankings closest to the average, indicating opportunities to affect overall satisfaction through targeted improvements. It should be noted that bus-rail transfers, which means both bus to bus and bus to rail transfers, only affect a little over one half of all riders. The fact that this attribute shows up as one of the most important suggests that for those riders who need to transfer this is a major pivot point for their overall level of satisfaction.
- **Walking distance to bus stops** receives high marks, but is less important to riders than other attributes. The **frequency of buses during peak hours** also ranks above average in performance but is on the border between low and high importance, suggesting that current riders are moderately satisfied with the level of service in peak periods.

- Riders feel that Pace and CTA are underperforming on **midday frequency, evening hours, weekend hours, and weekend frequency**. However, these also have lower importance, indicating that improving these attributes would have a lesser influence on improving overall customer satisfaction. Of these, midday frequency is closest to the median, indicating that this attribute plays a greater role in riders' overall satisfaction than evening hours or weekend service.

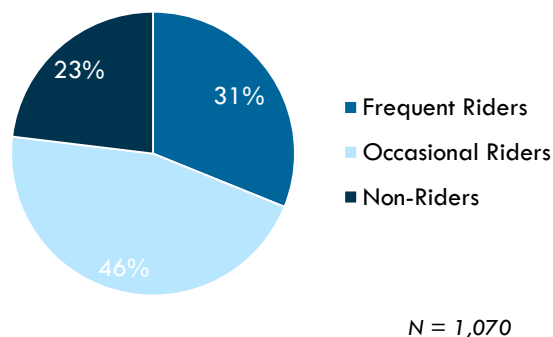
6 GENERAL PUBLIC SURVEY

Over 1,000 people responded to a general public survey, both online (54%) and in-person (46%), in spring 2016. People filled out surveys at five locations in the North Shore study area: Old Orchard Mall, Davis Station in downtown Evanston, Proesel Park (Summer Concert Series) in Lincolnwood, Wilmette Station, and the CTA Red Line Howard Station in Rogers Park. Online surveys were also available, and sent to major employers and communities in the study area via email. The results from this survey help identify the market potential for attracting new riders within the study area and better understanding their needs.

How often do people ride Pace or CTA buses?

While there are transit riders in the group of general public survey respondents, they tend to be less frequent riders than those who took the rider survey. Nearly half of people who took the general public survey reported using the bus less than once per week as opposed to the rider survey where nearly 70% of respondents took the bus 5, or more days per week. The figure below shows how often people reported riding Pace or CTA buses in the general public survey.

Figure 6-1 Frequency of Pace/CTA Bus Use

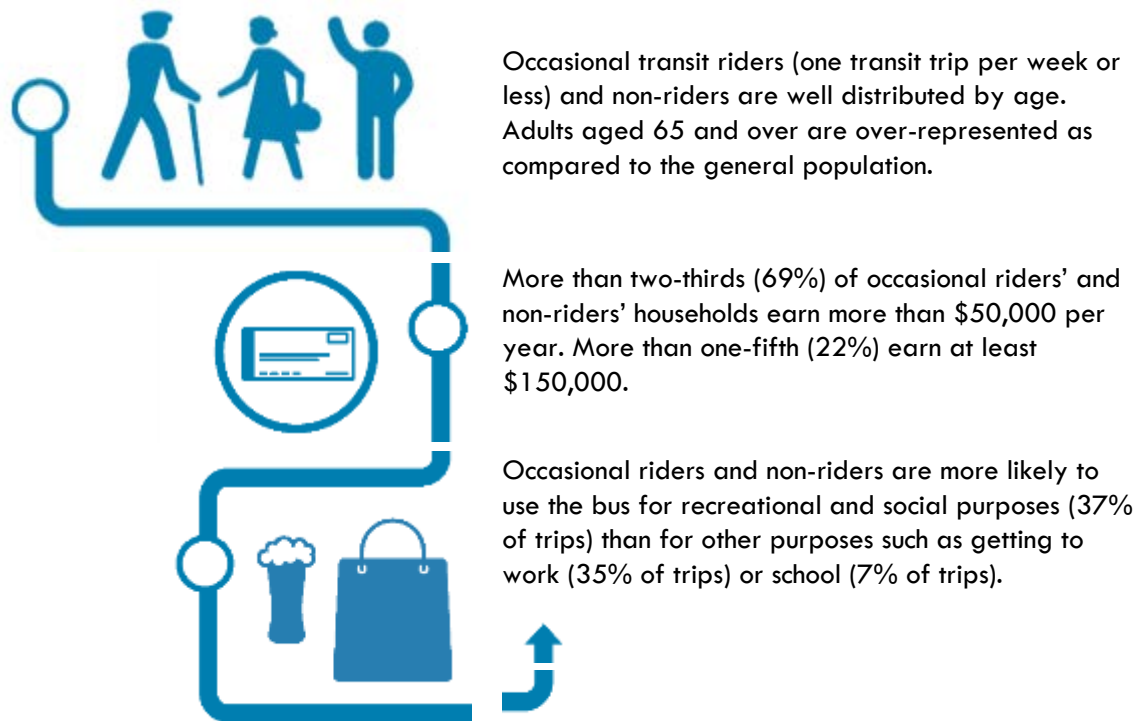


Among the 1,070 people who responded to the survey:

- 31% are **frequent riders**, riding Pace or CTA buses two or more times per week
- 46% are **occasional riders**, riding Pace or CTA buses once per week or less
- 23% are **non-riders**, who have not ridden Pace or CTA buses any time in the past year

We focused the findings below on responses from people who do not ride the bus often—occasional and non-riders—as these groups represent a potential market for increasing bus transit ridership in the North Shore area.

Who are they?



Where are they going?

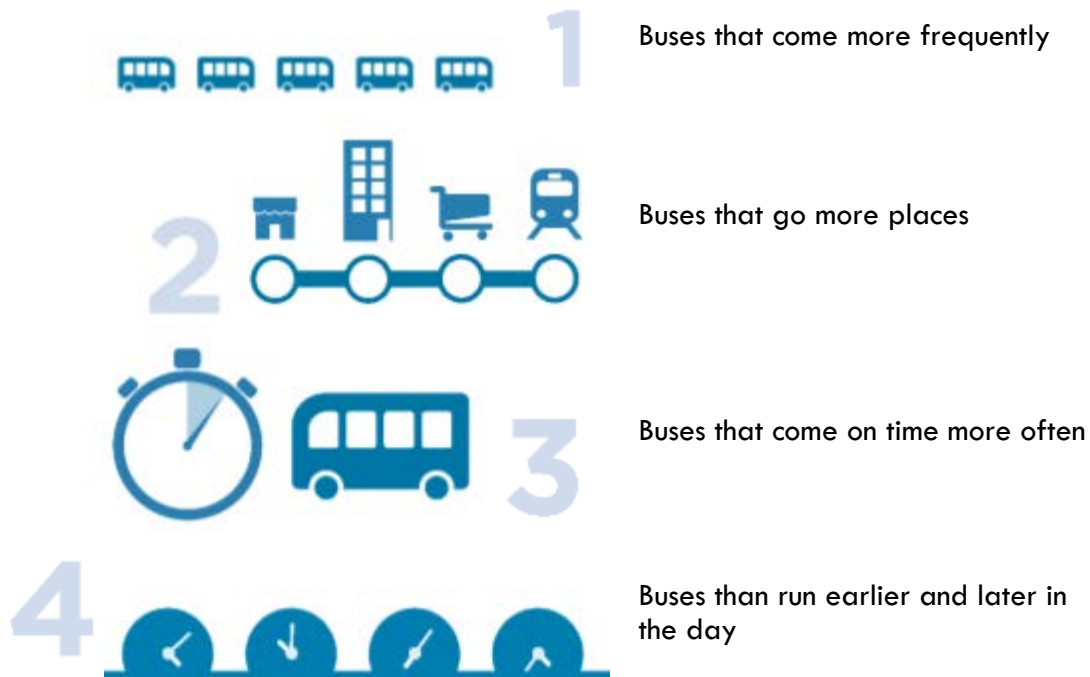
Occasional transit riders' and non-transit riders' travel patterns are shown in the maps in Figure 6-4 and Figure 6-5 and contrasted with the same information from the on-board survey in Figure 6-2 and Figure 6-3. Occasional and non-transit riders have a higher amount of non-commute trips (e.g., for shopping, recreation, or socializing) going to destinations south of the study area than transit riders.

The most important trip origins and destinations for occasional transit riders and non-riders are:

- Evanston
- Skokie
- Wilmette
- Rogers Park
- Downtown Chicago

What would make them ride more?

Occasional transit riders and non-riders would like increased frequency, service to new areas, more reliable service, and extended operating hours.



When asked what would get them to ride more, occasional riders and non-riders also favored service improvements that enhance travel within the North Shore area over travel to downtown Chicago via CTA or Metra rail.

Overall Satisfaction

We also looked at people's overall satisfaction with Pace and CTA bus service in the area based on how frequently they take the bus and place of residence. We found that:

A common reason **infrequent and non-riders** cited for not riding more is that transit information is confusing or too hard to understand. Efforts to clarify or distribute information about transit may encourage people to try transit.



Residents requested more destinations in **Lincolnwood**; 37% of Lincolnwood residents mentioned coverage as one of the reasons they do not ride more often, and 54% listed coverage as the best way to get them to ride more often.

Evanston residents are more likely to say that service is not frequent enough or does not take them to where they want to go. This indicates that coverage in Evanston or destinations available from Evanston if improved might attract more riders.



Figure 6-2 On-Board Survey Travel Patterns Map – Commute Trips

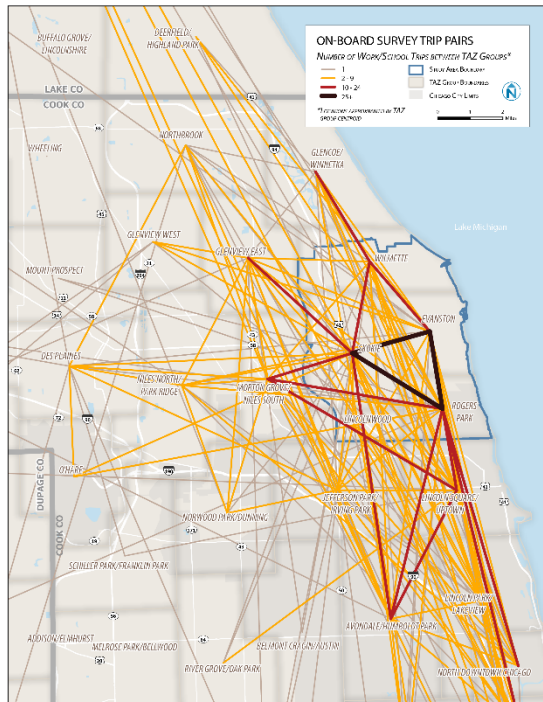


Figure 6-3 On-Board Survey Travel Patterns Map – Non-Commute Trips

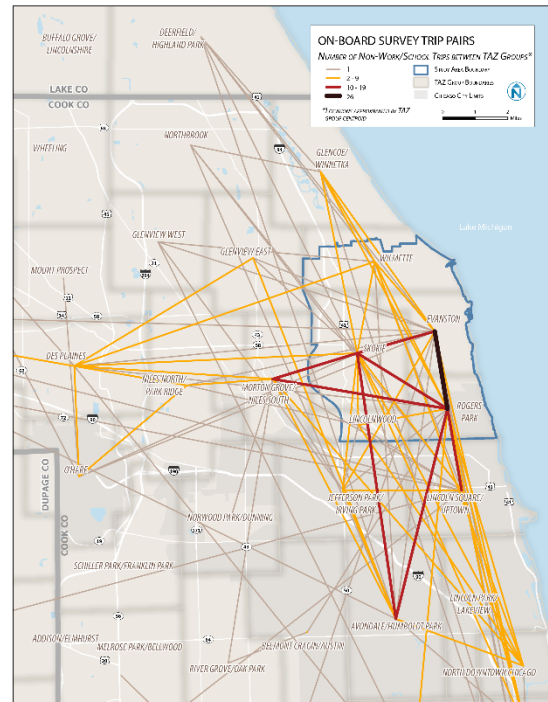


Figure 6-4 General Public Survey Travel Patterns Map – Commute Trips

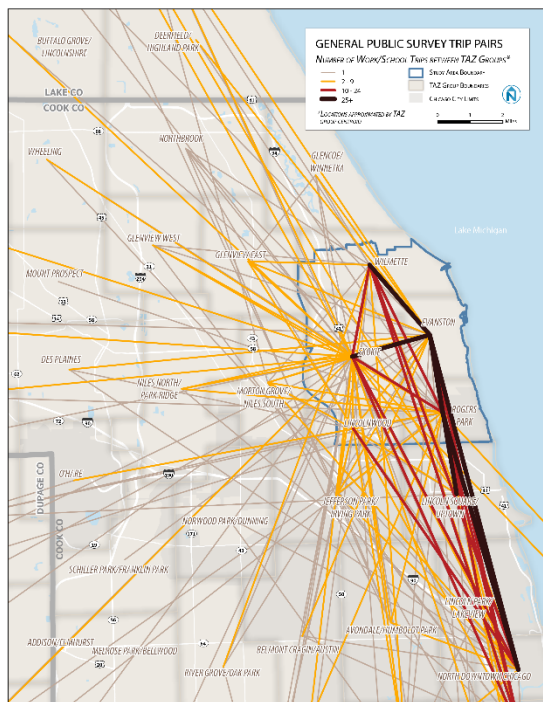
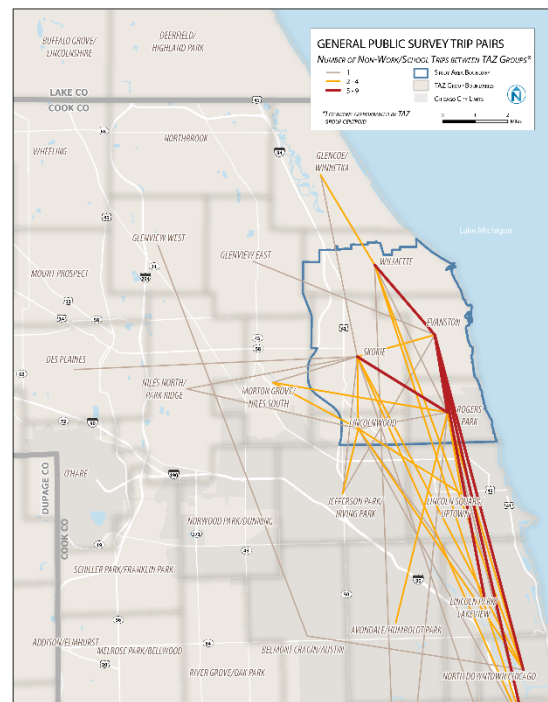


Figure 6-5 General Public Survey Travel Patterns Map – Non-Commute Trips



7 SERVICE ASSESSMENT

Pace and CTA bus routes were evaluated to determine how well existing bus services are operating on terms of ridership, productivity and on-time performance. In addition to ridership and productivity measures (which show how well routes perform), this assessment examines schedule adherence, service span, frequency, and coverage to illustrate potential transit market opportunities in the North Shore study area.

Ridership

Ridership numbers come from Pace and CTA automatic passenger count (APC) data collected during April 2016. In total there are about 35,719 boardings per weekday that occur within the study area.

Productivity

Productivity is a common indicator used to compare performance among routes. For this study, productivity is measured by dividing the average number of passenger boardings in a day by the number of revenue vehicle hours required to operate the service.

Ordinarily, Pace and CTA use different definitions of revenue hours, which may affect estimated productivity levels on agency-specific routes. Pace revenue hours are defined as “in-service only,” whereas CTA revenue hours are the number of vehicle hours required to operate the service, which includes out of service hours such as deadheading and layovers. For the purposes of this study, the Pace definition of revenue hours (in-service only) is used for both agencies.

Note that productivity for the routes in the service area account for all ridership and “in-service” hours on each route, not just those occurring within the study area boundaries.

Stop-level Ridership

Figure 7-1 illustrates the average weekday ridership on Pace and CTA bus routes in the service area, with total boardings for each route combined at the stop level. Figure 7-2 illustrates both average weekday ridership and transit propensity, an index of demographic indicators and useful tool in measuring area ridership potential both within existing corridors and in locations where there is currently no transit service.

Bus stops with the most ridership activity tend to be located in areas with the highest transit propensity (see Figure 7-2 below), namely to the southern and eastern portions of the study area (Rogers Park, West Ridge, and Evanston) and along the Skokie Boulevard corridor. Additionally, the highest ridership stops along the eastern edge are at or around CTA rail stations. Individual stops with the most ridership activity (in order) are Howard Station, Davis Station, Loyola Station, and Old Orchard Mall. The highest ridership corridor is along Devon Avenue where CTA Route 155 operates.

Figure 7-1 Pace and CTA Weekday Ridership Map

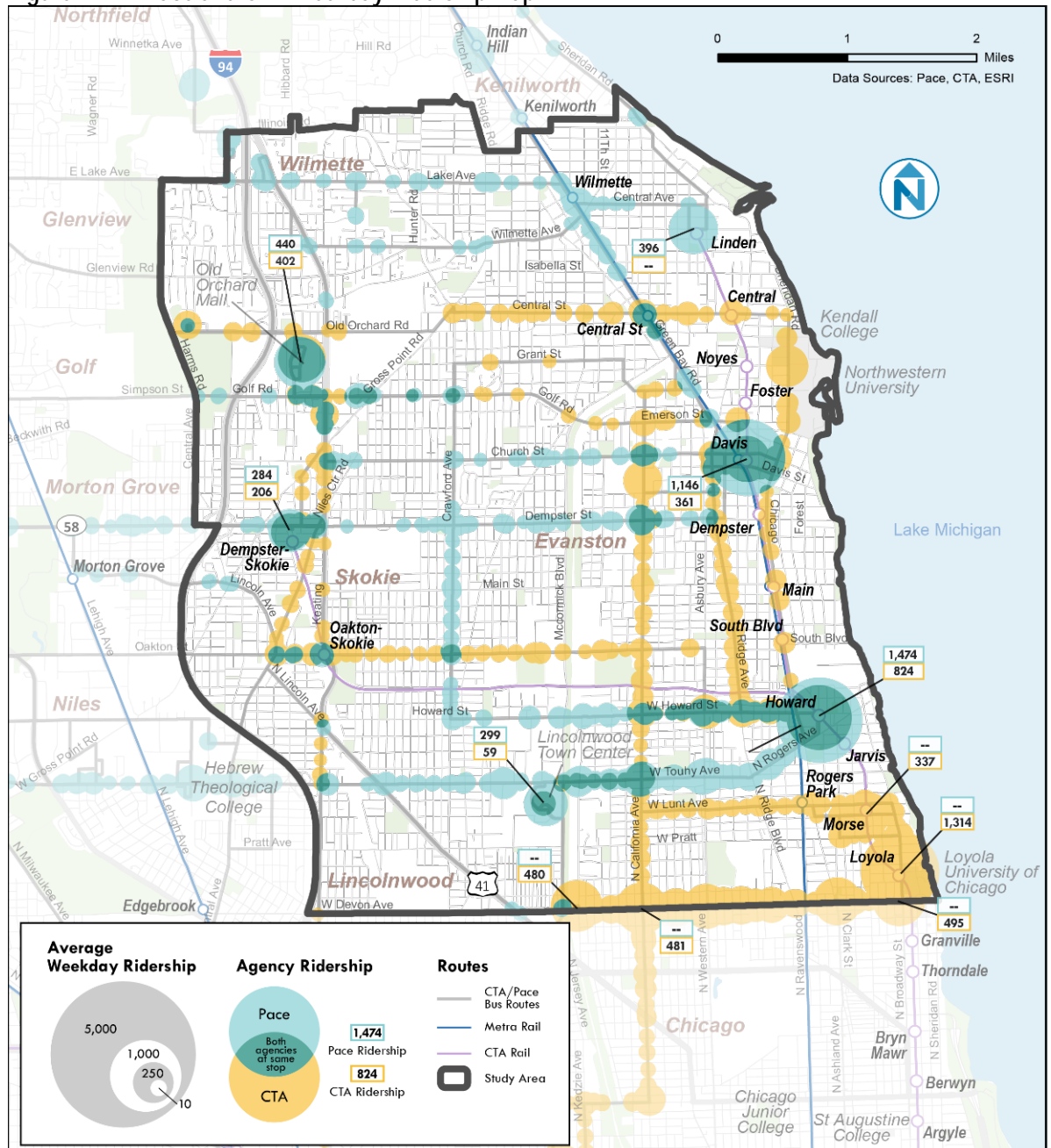
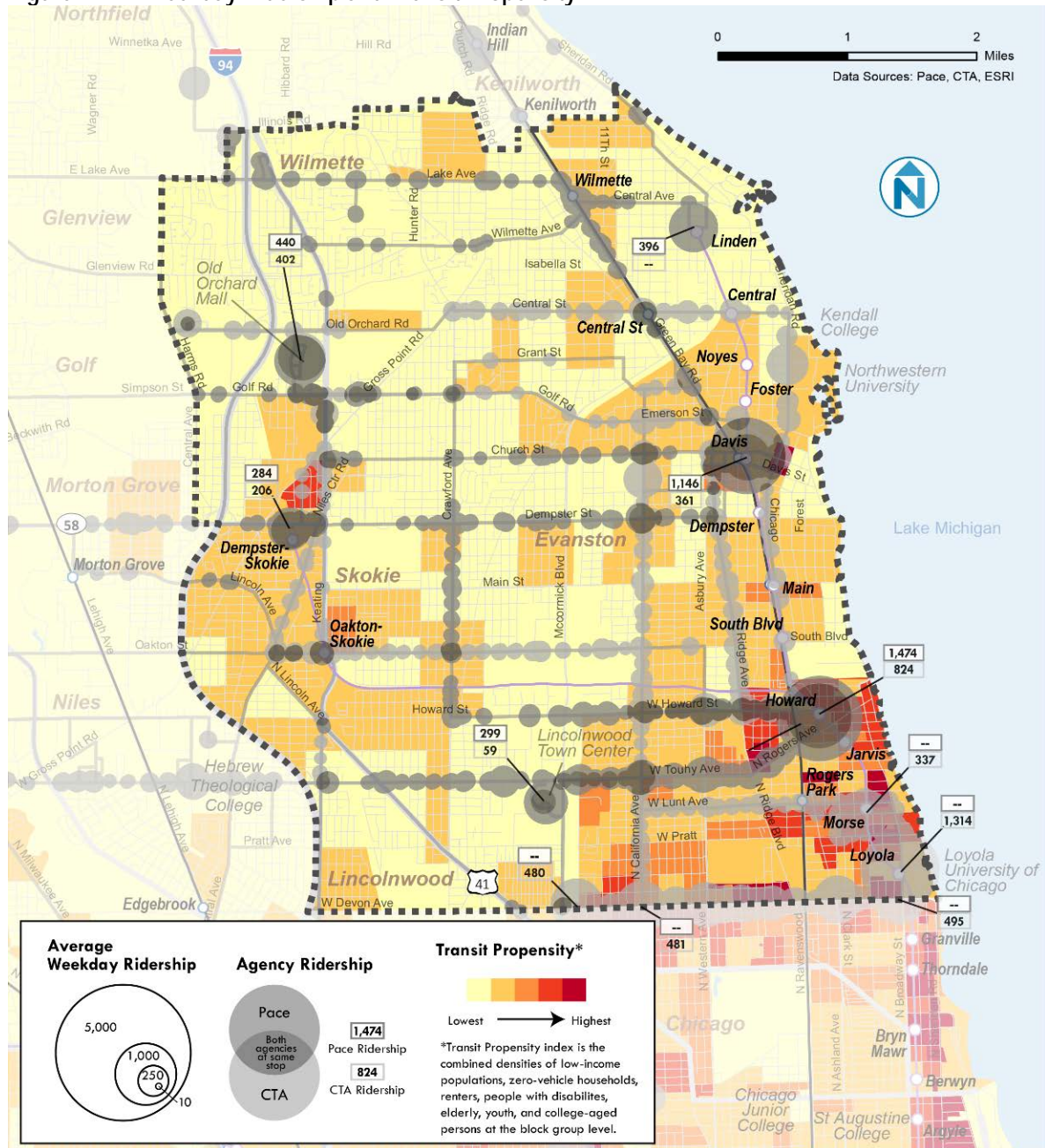


Figure 7-2 Weekday Ridership and Transit Propensity



Ridership by Route

Pace and CTA ridership figures by route are shown in Figure 7-3 through Figure 7-6. Note that the daily ridership totals include all ridership on the route. Many routes extend beyond the study area. Therefore, figures below include ridership that may or may not occur within the study area.

- Among Pace routes in the study area, routes 290, 250, and 208 have the highest weekday ridership with over 2,000 boardings per day.
- CTA route 155 has more than double the ridership of other bus routes in the study area at 7,745 boardings per weekday.
- Other high ridership weekday CTA routes that serve the study area are 93, 97, and 201. These routes have weekday ridership of over 2,000 boardings per day.
- Albeit with lower totals, weekend routes have the same relative ranking of ridership as their weekday counterparts, with the exception of CTA Routes 93 and 97 (with Route 97 carrying more passengers than Route 93 on Saturdays).

Figure 7-3 Pace Weekday Ridership

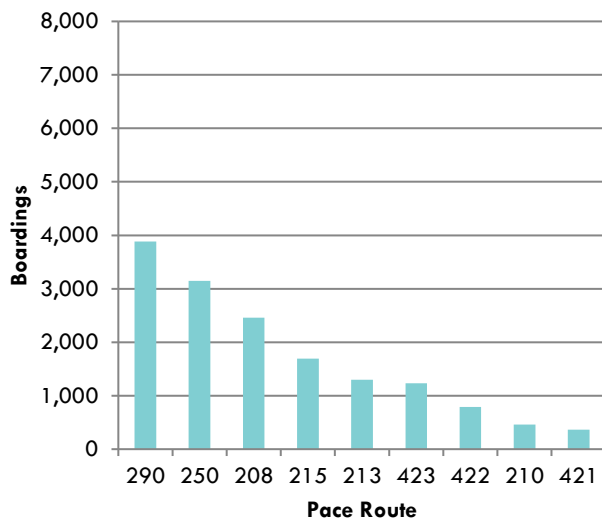


Figure 7-4 CTA Weekday Ridership

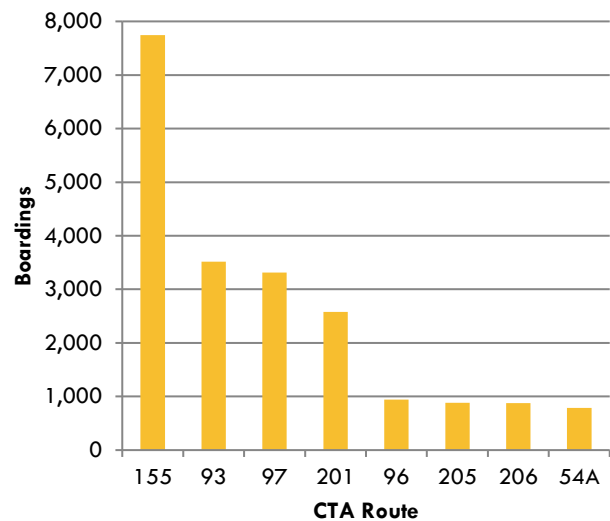


Figure 7-5 Pace Weekend Ridership

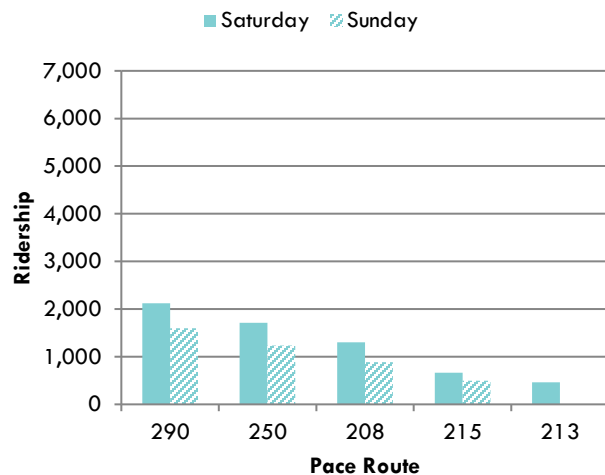
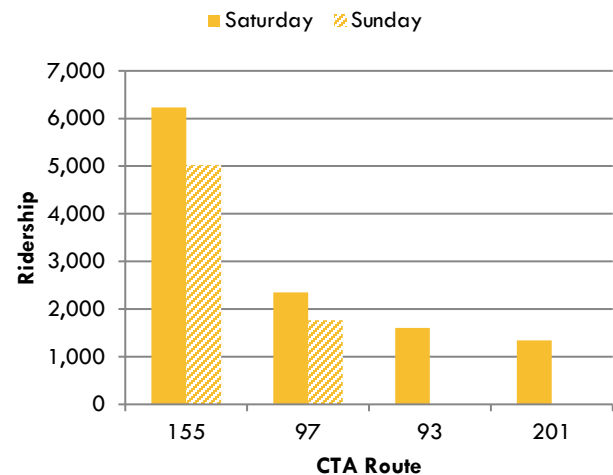


Figure 7-6 CTA Weekend Ridership



Productivity by Route

Pace and CTA bus routes in the study area have a wide range of productivity, averaging from as few as 10 to over 90 weekday boardings per in-service hour. Productivity by route is shown in Figure 7-7 through Figure 7-10.

- CTA route 155 has the highest productivity of any bus route in the study area, with an average of 94 weekday boardings per in-service hour.
- Other CTA routes with high ridership (201, 93, and 97) also have high productivity, averaging 40 or more weekday boardings per in-service hour.
- Pace routes 215, 290, and 250 have the highest weekday productivity among Pace bus services in the study area. These routes average 30 or more boardings per in-service hour on weekdays.
- Pace route 421 is also highly productive, despite having the lowest weekday ridership of bus routes in the study area. This is due to the school trips this route operates to Loyola Academy and New Trier High School.
- CTA's four most productive weekday routes are the only routes that operate on weekends.
- Pace's five most productive weekday routes (excluding Route 421, which serves a large student population) are the only ones that operate on weekends.
- CTA's least productive weekday routes are Route 54A and Route 205. Each of these routes has less than 30 average weekday boardings per in-service hour. Neither of these routes is operated on weekends.
- Pace's least productive weekday routes are Route 210 and Route 422; each has less than 20 average weekday boardings per in-service hour. These routes are not operated on weekends.

Figure 7-7 Pace Weekday Productivity

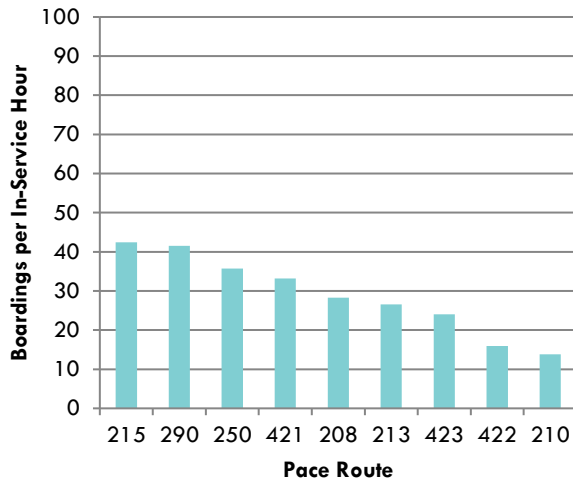


Figure 7-8 CTA Weekday Productivity

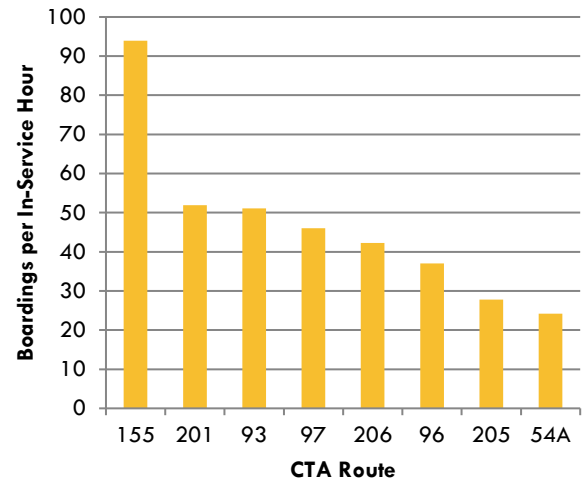


Figure 7-9 Pace Weekend Productivity

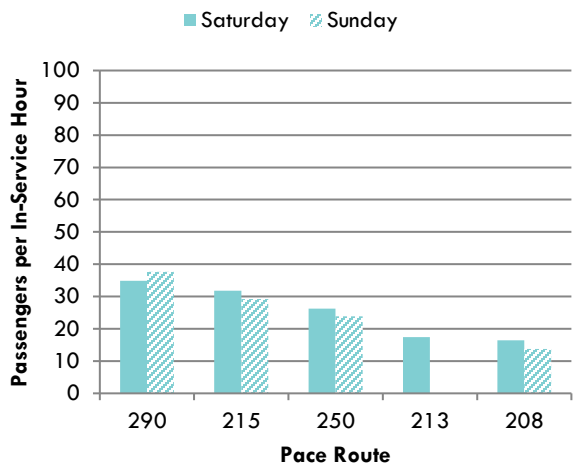
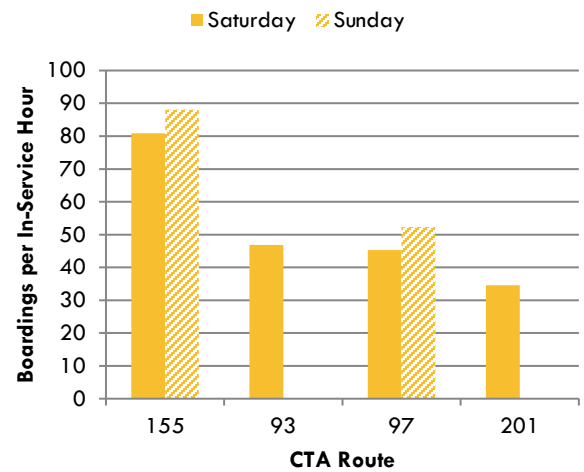


Figure 7-10 CTA Weekend Productivity



Schedule Adherence

On-time performance is a measure that shows the percentage of on-time arrivals and departures. Among both on-board survey and general public participants, better on-time performance was the third-most requested improvement for service. For both Pace and CTA, a bus is considered to be on time if it is no more than one minute early (or five minutes early for Pace routes at the last timepoint) and no more than five minutes late at a given time point. It should be noted, however, that data between the agencies is not directly comparable due to different methods for selecting timepoints to calculate on-time performance. Weekday on-time performance is shown for Pace and CTA bus routes in the study area in Figure 7-11 and Figure 7-12.

- For weekday study-area routes, only three have on-time averages at or above 90% (Pace Route 213 and CTA Routes 97 and 201).
- Over one-third of routes have on-time performance averages below 80%. These may merit consideration for adjusting schedules to more accurately reflect running times. In some instances, running times that are too long for certain route segments may be contributing to on-time performance issues.
- For nearly all routes, unreliability is caused by late running. Pace Route 210 and CTA Route 97 are the exceptions with slightly higher shares of early running. Pace will soon be implementing a schedule optimization for Route 208 to address on-time performance issues on that route.

Figure 7-11 Pace Weekday On-Time Performance

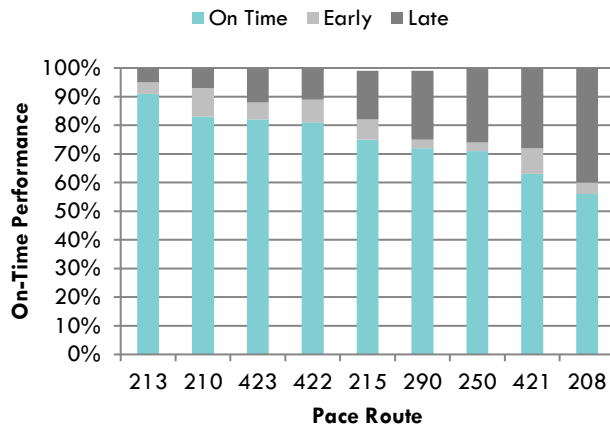
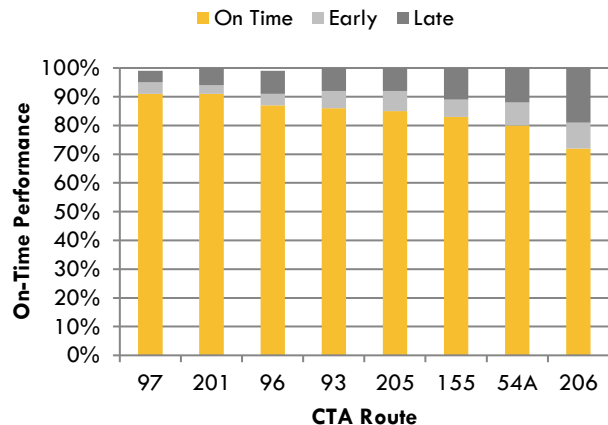


Figure 7-12 CTA Weekday On-Time Performance



Service Span

Figure 7-13 through Figure 7-18 are visualizations of the weekday, Saturday, and Sunday service spans for study area Pace and CTA routes. Weekday morning service hours scored above average among service attributes for rider satisfaction. However, evening hours scored slightly below average, and weekend hours had the lowest score among all service attributes.

- Roughly 75% of study-area weekday routes begin service at or before 6 a.m.
- Only four study-area routes run past midnight (Pace Routes 215, 250, 290, and CTA Route 155). Six of the study-area routes end before 8 p.m.
- Routes with relatively high productivity during their final hours of service include Pace Routes 215 and 290 and CTA Routes 96 and 201. This can be an indicator of latent demand and may warrant consideration for extended operating hours and/or increased frequency during evening hours.
- Only about 50% of routes operate on Saturdays, and only 35% of routes operate on Sundays. In general, routes with the shortest operating times on weekdays do not operate on weekends.

Figure 7-13 Pace Weekday Service Span

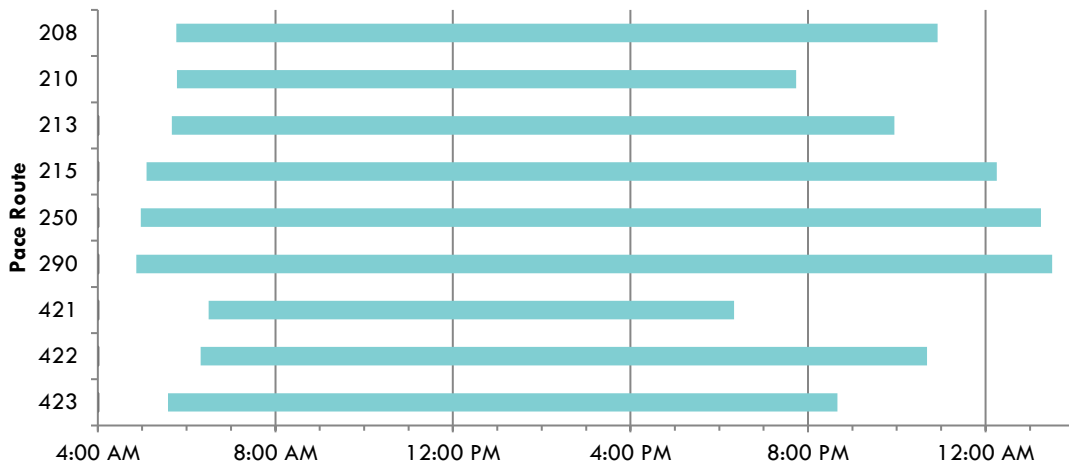


Figure 7-14 Pace Saturday Service Span

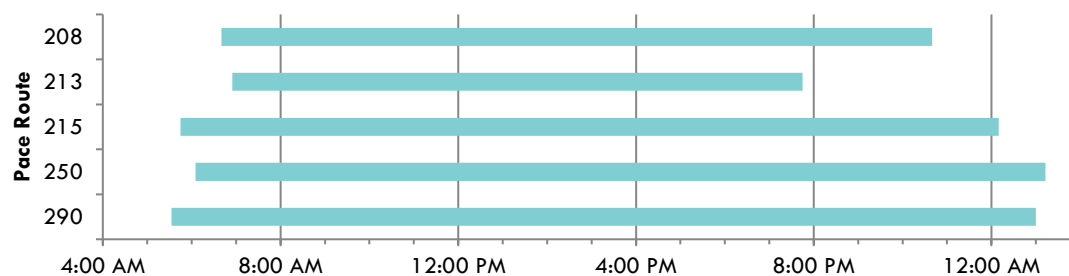


Figure 7-15 Pace Sunday Service Span

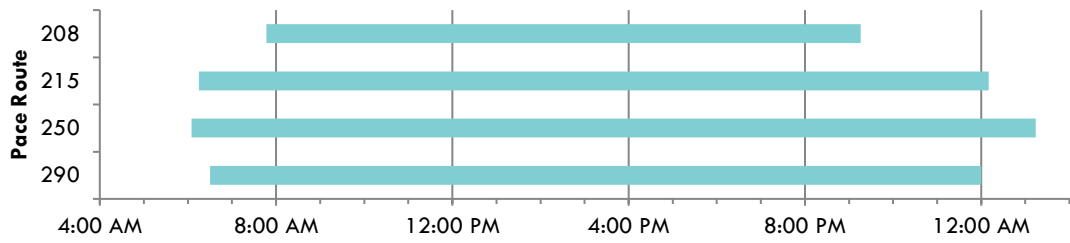


Figure 7-16 CTA Weekday Service Span

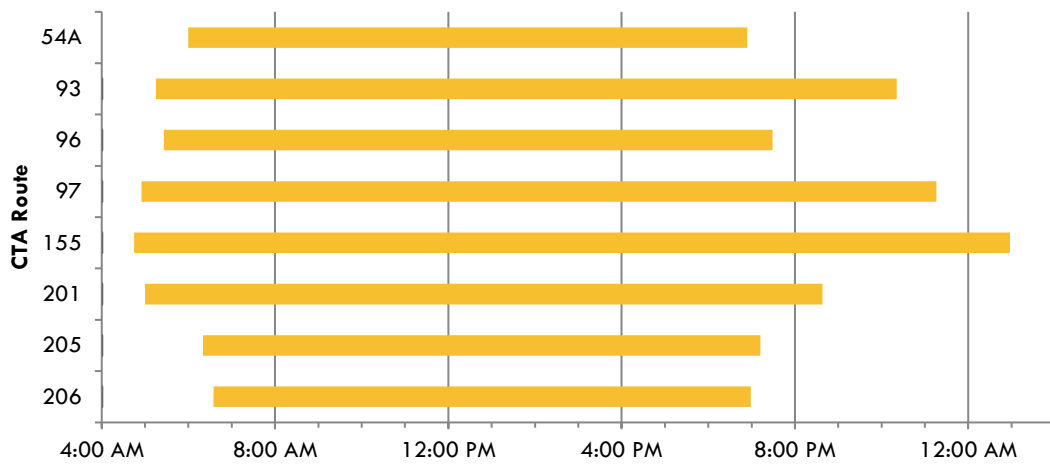


Figure 7-17 CTA Saturday Service Span

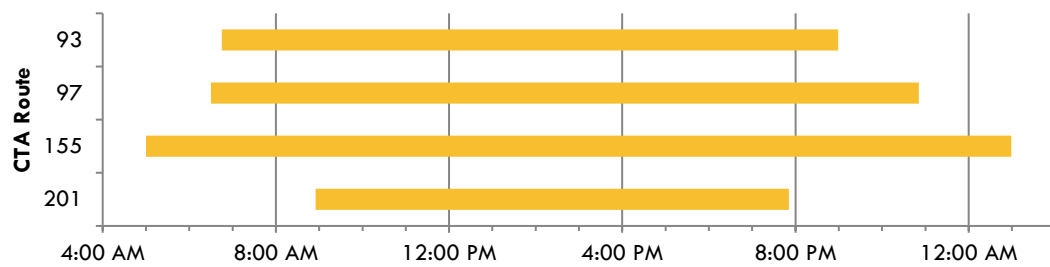
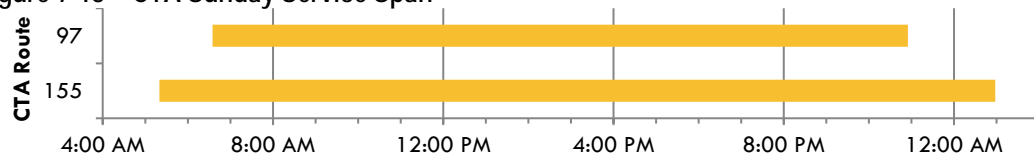


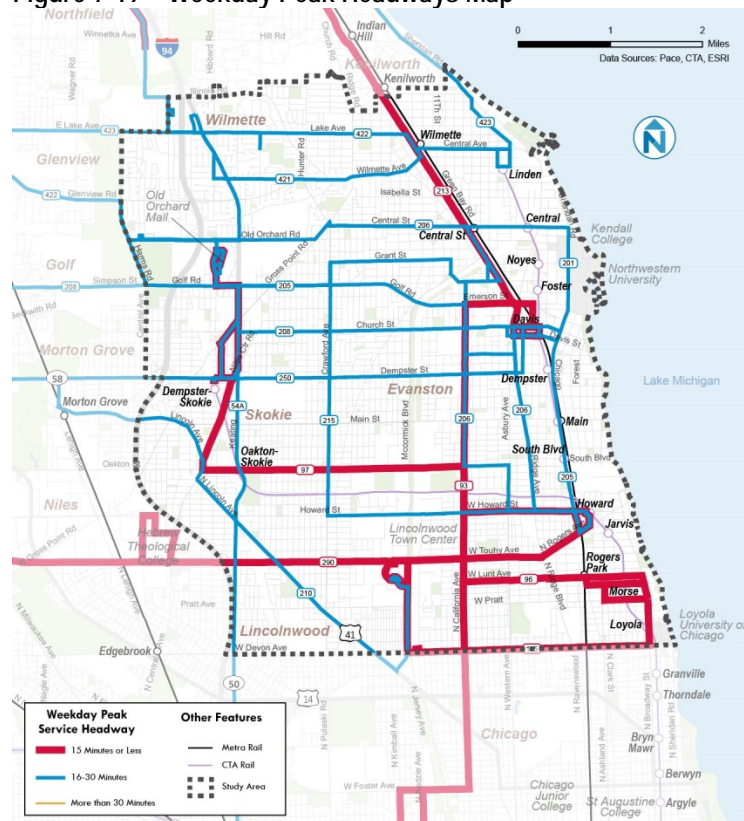
Figure 7-18 CTA Sunday Service Span



Service Frequency and Coverage

The maps below show the route coverage and service frequencies available on weekdays (both peak and off-peak), Saturday, and Sunday. Corridor frequencies are represented based on the following groupings: 15 minutes or less, 16-30 minutes, and more than 30 minutes.

Figure 7-19 Weekday Peak Headways Map



For customers, the higher the frequency, the more attractive and useful the service and the less coordination required to time connections between routes. When a route operates every 15 minutes or better, customers tend to rely less on schedules, perceiving the next bus or train will arrive in a few minutes.

Figure 7-20 Weekday Off-Peak Headways Map

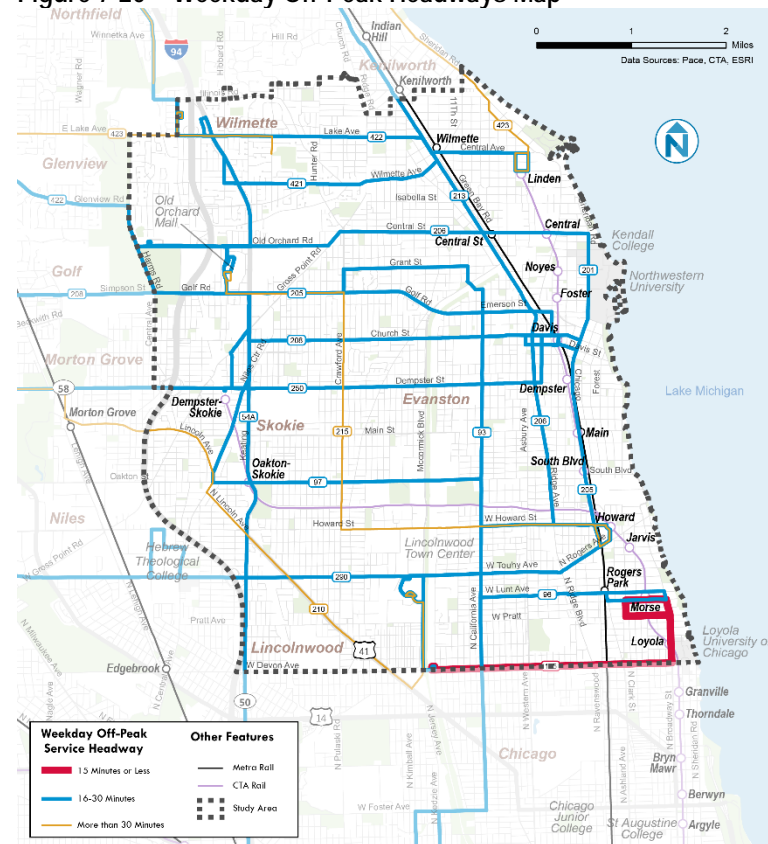


Figure 7-21 Saturday Service Headways Map



Figure 7-22 Sunday Service Headways Map



Transfers

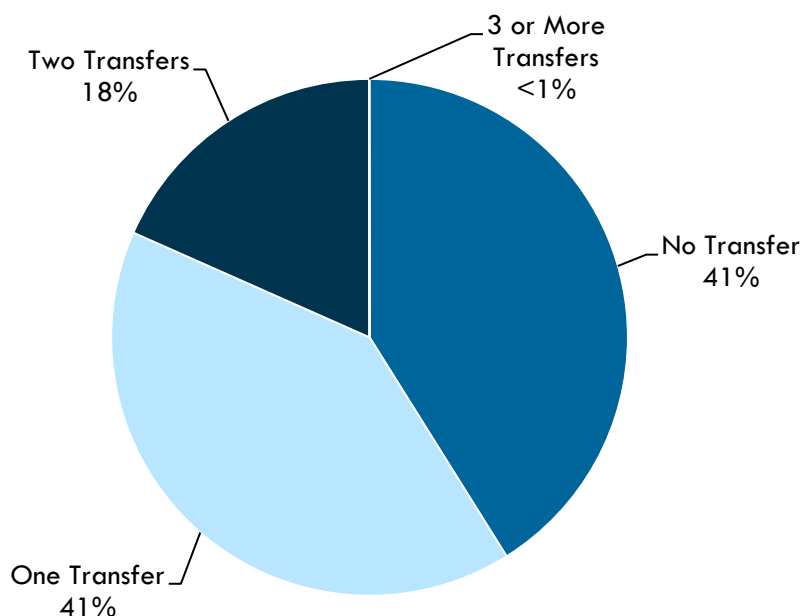
This section summarizes transfer activity to and from study area Pace and CTA bus routes.

Transfer Activity

The following pie chart shows the average number of transfers required to complete a weekday trip on Pace and CTA bus routes within the North Shore study area. Trip data for this chart comes from October 2015 Ventra card trip records. For consistency with the Market Analysis, only transfer data for the original study area routes are included in these totals. However, the data is for the entire route and some routes operate outside the study area. In the “Transfer Patterns” paragraphs and figure below, other “non-study area” routes have been added to show their relationship with transit services within the study area.

More than half (59%) of weekday trips are completed on Pace and CTA bus routes in the study area with a transfer. Of riders who transfer, 41% require one transfer and 18% require two transfers to complete. Fewer than 0.01% of trips are completed using three transfers or more.

Figure 7-23 Number of Transfers Required to Complete Trip



Source: October 2015 Ventra data for Pace Routes 208, 210, 213, 215, 250, 290 421, 422, 423 and CTA Routes 54A, 93, 96, 97, 155, 201, 205, 206

Transfer Patterns

The following matrix shows the frequency of weekday transfers between routes in study area, other Pace and CTA bus routes, and CTA rail. In addition to North Shore study area routes, transfer information for Pace Route 226 and CTA Routes 11, 53, and 82 is included. Transfer data comes October 2015 Ventra card trip records. Key analytical parameters were established for the transfer matrix and findings that follow:

- Transfer matrix excludes transfers where the route number was unknown or missing in the data (roughly 4% of all trips)
- The transfer matrix excludes transfers made to/from the same route (roughly 12% of all trips)
- Some of these transfers occur outside the study area, as the majority of these routes travel outside the study area.

Overall, transfers to other CTA bus routes and CTA rail were the most common—42% of all transfers were to other CTA bus routes and another 41% were to CTA rail. CTA routes 53 and 82 had the highest levels of transfer activity to other CTA bus routes and CTA rail. These routes travel north-south and provide multiple opportunities to transfer to CTA rail and with east-west services. Pace Route 290 and CTA Routes 97, 155, and 11 also have high levels of transfer activity with CTA rail.

Among study area bus routes, the most notable transfer activity occurs between the following bus routes (in order of magnitude):

- CTA Route 82 and CTA Route 155
- CTA Route 93 and CTA Route 97
- CTA Route 82 and Pace Route 290
- CTA Route 93 and CTA Route 155
- CTA Route 93 and Pace Route 290
- CTA Route 82 and CTA Route 93.
- Pace Route 208 and other Pace bus routes
- Pace Route 250 and other Pace bus routes
- Pace Route 290 and other CTA bus routes

These transfer patterns are consistent with the transfer patterns observed in rider survey data. The Rider Survey (Section 5), however, focused almost exclusively on the study area; therefore, even though the results of the two data sets are similar some variances in the exact numbers are expected.

Figure 7-24 Transfer Matrix (Combined Weekday Pace and CTA Transfer Activity)

			Route/Agency																					
			Pace Bus Routes										CTA Bus Routes											
			208	210	213	215	225	226	250	290	421	422	423	11	53	54A	82	93	96	97	155	201	205	206
Route/Agency	Pace Bus Routes	210	21																					
		213	27	-																				
		215	50	0	-																			
		225	-	0	-	-																		
		226	25	10	0	0	3																	
		250	185	34	47	35	0	27																
		290	3	27	0	34	19	41	8															
		421	0	0	25	-	-	-	-	-														
		422	43	13	29	35	-	-	0	1	6													
		423	40	12	30	0	-	11	44	51	4	21												
	CTA Bus Routes	11	0	22	-	52	-	-	-	53	-	-	0											
		53	0	0	-	0	0	1	0	0	-	0	0	1										
		54A	16	5	-	8	-	1	50	43	-	22	-	0	31									
		82	-	71	0	2	-	0	-	238	-	-	0	151	76	0								
		93	60	1	103	81	-	-	117	194	-	0	0	41	3	0	271							
		96	0	6	0	2	-	-	0	84	-	0	0	19	-	-	187	59						
		97	103	49	1	111	1	94	149	56	1	53	0	4	0	55	1	303	2					
		155	-	22	0	0	-	-	1	2	0	-	0	86	0	-	526	237	58	2				
		201	42	1	35	26	-	1	32	25	0	14	0	0	0	13	0	28	0	100	0			
		205	26	0	11	15	-	-	9	17	-	7	-	-	0	12	0	40	-	33	0	27		
		206	1	0	5	11	-	-	8	8	-	1	-	-	-	1	-	20	1	17	-	22	6	
		Other Pace Bus	385	5	26	1	1	39	340	136	0	4	24	0	21	16	4	2	1	15	0	1	0	0
		Other CTA Bus	8	6	5	145	59	144	26	375	4	6	96	350	7,557	253	6,347	425	98	372	525	91	44	29
		CTA Rail	250	30	308	427	72	245	413	1,156	119	168	439	558	4,404	124	4,557	394	295	976	821	354	175	95

Data Source: October 2015 Ventra Transfer data

Frequency and Coverage Compared to Transit Markets

Analyzing route coverage and service frequency maps in relation to findings from the market analysis (including transit propensity and major travel patterns), provides a visual reference for how well the network is meeting the mobility needs of current and potential riders. It is important to note that improved frequency was found to be the number one service improvement that would encourage general public survey respondents to ride more and number two service improvement priority among rider survey respondents.

Travel Demand Patterns

- Many major home-based work trips are well served by frequent bus and CTA rail service during weekday peak hours. Major regional commute patterns that have frequent weekday peak service include Evanston and Downtown Chicago, Evanston and Rogers Park, and Skokie and Rogers Park.
- There is a lack of high-frequency service between Evanston and Skokie and between Skokie and Niles; both major regional commute patterns (see Figure 4-1). Implementation of the upcoming Pulse Dempster Line will improve this transit commute with faster, more reliable service.
- There is a lack of frequent transit service between Skokie and Jefferson Park/Irving Park (another major regional commute pattern; see Figure 4-1). Although Route 54A serves Irving Park, it runs on 30 minute headways most of the day. Route 226 (a non-study-area route) provides service between downtown Skokie and Jefferson Park but ends service around 7 p.m. Neither of these routes operate on weekends.
- In addition to the commute trip patterns described above, regional travel data suggest there is opportunity for transit to better serve non-commute trips. Major travel pairs not currently served by frequent transit include Skokie-Glenview East, Skokie-Wilmette, Lincolnwood-Lincoln Square/Uptown, and Skokie-Lincoln Square/Uptown.
- However, it should be noted that due to a lack of transit-supportive densities in some of these areas (and the sporadic nature of non-commute trips), new or increased service for these trip pairs may not prove as successful as commuter-oriented service.

Transit Propensity

- Areas with the highest density of transit-supportive populations (Evanston, Rogers Park, West Ridge, and the Skokie Avenue Corridor) are well served by high frequency bus service and CTA Purple Line service during weekday peak hours. During off-peak service, and on weekends, Route 155 is the only bus route operating at high frequencies. Weekday peak service frequency and transit propensity are compared in Figure 7-25.

Weekday Peak Service Headway

- 15 Minutes or Better
- 16-30 Minutes

Other Features

- Metra Rail
- CTA Rail
- Study Area

Transit Propensity*

Lowest → Highest

*Transit Propensity index is the combined densities of low-income populations, zero-vehicle households, renters, people with disabilities, elderly, youth, and college-aged persons at the block group level.

Scale: 0 to 2 Miles

Data Sources: Pace, CTA, ESRI

Route Spacing

In assessing route spacing, finding areas where routes are duplicative (or provide nearby competing service) is an important step in identifying opportunities to provide better coverage for riders. In some cases, routes may be too closely spaced given the productivity of the routes or the transit propensity of the surrounding area. It should be noted that some duplication may be unavoidable due to constraints of the route network and the need to serve high-ridership generators. Notable duplicated/competing segments include:

- Routes 54A and 97 provide competing service between Oakton-Skokie Station and Old Orchard Mall.
- Route 96 has the same start and end point as more frequent Route 155.
- Routes 97 and 215 provide competing service on Howard Street between Howard Station and Dodge Avenue.
- Route 205 is duplicated by CTA Rail (Chicago Avenue), Route 93 (Dodge Avenue), Route 208 (Dodge Avenue), and Route 215 (Golf Road).
- Route 206 is duplicated by Route 93 (Dodge Avenue) and Route 201 (Ridge Avenue and Central Street).
- Route 210 on Waukegan Road has competing parallel service from Route 423 on Harlem.
- Route 96 and Route 290 provide overlapping service on Touhy and operate with closely spaced service between California Avenue and Ridge Boulevard.
- Routes 201, 205, 206 and 250 operating on East-West streets between Dempster and Central from Crawford to Green Bay Road, are spaced one quarter to one half mile apart while other areas with higher densities have routes spaced one mile, or more, apart.

Weekend Service Gaps

- Compared to weekday service, coverage on the weekends drops off notably, with only 9 out of 17 service-area routes operating on Saturday and 6 operating on Sunday. Among these, all but Route 215 (with 40-minute headways) operate every 30 minutes or better. Considering that Route 215 has the second-highest productivity among weekend Pace routes, it may merit consideration for improved headways.
- On weekends there is no north-south service linking Skokie and Lincolnwood to Jefferson Park and Irving Park (an important travel pattern among non-commute trips according to regional travel models). There is also no north-south service between Skokie and Wilmette and no east-west service in Wilmette. Sunday service also lacks north-south service between West Ridge and Evanston and no east-west service in northern Evanston.

Bus Headways

- As shown in Figure 7-24 below, corridors with the highest peak-service frequency tend to attract the highest ridership. These include Devon Avenue, Touhy Avenue, Howard Street, and Skokie Boulevard.
- On weekdays, visible off-peak headway reductions occur on the following corridors: Lincoln Avenue, Lunt Avenue, Touhy Avenue, Howard Street, Oakton Street, Niles Center Road, Skokie Boulevard, Crawford Avenue, Green Bay Road, and Sheridan Road. Based on corridor ridership (Figure 7-24 below) and transit propensity (Figure 7-23 above) Touhy Avenue (Route 290) and Howard Street (Routes 97 and 215) may be good

candidates for improving midday frequency. It should be noted that Routes 215 and 290 are most productive during midday service. Route 97 is also highly productive during midday service (second only to its p.m. peak service).

- There is an emerging trend for young adults to live in areas where they can use transit for all trip purposes, providing an opportunity to attract more all-purpose trip riders by increasing midday headways in areas with high proportions of younger adults. As shown in Figure 3-4, the highest densities of college-aged populations are in Rogers Park near Loyola University and in Evanston near Northwestern University. While Rogers Park already has high-frequency midday bus service with Route 155, there is room to improve midday frequency on Route 93 and Route 201, both of which provide service to Northwestern University and have high productivity during midday service.
- Areas and time periods in the study area where there is little or no ridership may indicate an opportunity to reallocate service to areas and time periods that can generate more ridership with the same service. Pace and CTA can reallocate resources from routes that are only productive during certain time periods by focusing on what generates the most ridership. For example, on Routes 421 and 423, ridership comes from a high school and is concentrated before and after school hours, presenting an opportunity to maintain service during school travel hours and reduce service during less productive times.

Figure 7-26 Weekday Peak Service Headway and Average Weekday Ridership

