



# RTA/Pace I-294 Tri-State Market & Facilities Feasibility Study

## Service Plans Technical Memorandum

Regional Transportation Authority and Pace Suburban Bus



Regional  
Transportation  
Authority



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## Abbreviations

ADA	Americans with Disabilities Act
CTPP	Census Transportation Planning Package
CMAP	Chicago Metropolitan Agency for Planning
CTA	Chicago Transit Authority
CCDOTH	Cook County Department of Transportation and Highways
FTA	Federal Transit Administration
GTFS	General Transit Feed Specification
MED	Metra Electric District
O&M	Operations and Maintenance Costs
RTA	Regional Transportation Authority
RID	Rock Island District
STOPS	Simplified Trips-on-Project Software (travel demand forecasting)
TIGER	Transportation Investment Generating Economic Recovery grant program

# 1. Study Background and Purpose

The Regional Transportation Authority (RTA) / Pace Bus I-294 Tri-State Market & Facilities Study (Study) identifies and evaluates ways that Pace buses can capitalize on roadway improvements being constructed by the Illinois State Toll Highway Authority (Illinois Tollway) on portions of the I-294 Tri-State Tollway.

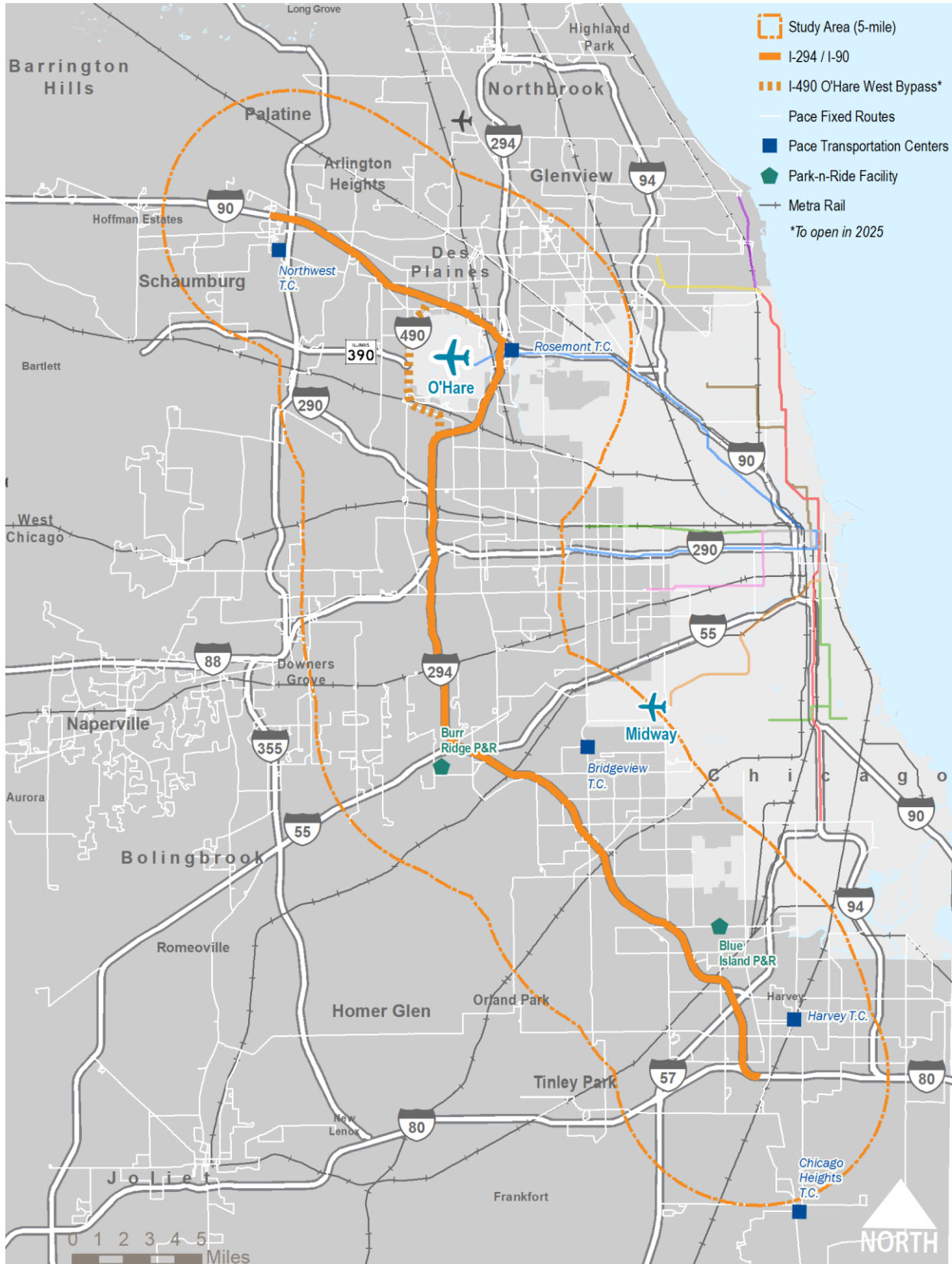
The Tri-State Tollway is a north-south roadway in the Chicago region, providing access to major employment centers and O'Hare International Airport. In 2016, Illinois Tollway initiated its Central Tri-State (I-294) Project, which includes the 22-mile segment between Balmoral Avenue and 95<sup>th</sup> Street. This segment carries the heaviest volume of passenger and freight traffic and has twice the amount of congestion delays compared to the entire Tollway system. The Central Tri-State Project will incorporate a number of innovations, including Flex Lanes, which will be available to Pace buses to avoid congestion. Pace has identified I-294 as a critical corridor because of its place as a primary travel corridor and the opportunity that Flex Lanes present. The Study will explore three key items:

1. The existing and future travel markets in the corridor,
2. Ways that the Pace network can be improved to better capture riders in the I-294 corridor, and
3. Ways that infrastructure can be added to capitalize on Flex Lanes and other roadway improvements being constructed by the Illinois Tollway.

## 1.1 Study Area

As shown in Figure 1-1, the Study Area covered a 5-mile radius centered along the 48-mile I-294/I-90 corridor between Harvey and Schaumburg. The roadway Study alignment also included I-490, which by 2025 will connect the I-90 Jane Addams Memorial Tollway, the IL-390 Elgin-O'Hare expressway, and the I-294 Tri-State Tollway along the west side of O'Hare Airport.

**Figure 1-1. Pace I-294 Market & Facilities Feasibility Study Area**



# 1.2 Task Overview

The Study involves five tasks that are listed below, including the relevant sub-tasks for Tasks 1 and 2.

## Task 1: Existing Conditions and Travel Market

- 1.1 Transit Service
- 1.2 Traffic Conditions
- 1.3 Market Analysis

## Task 2: Conceptual Service Design and Infrastructure

- 2.1 Service Plans
- 2.2 Generic Infrastructure Concepts
- 2.3 Station Concepts & Capital Costs

## Task 3: Implementation Plan

## Task 4: Public Outreach and Marketing

## Task 5: Final Report

This technical memorandum covered Task 2.1, which built on the work of Task 1, Existing Conditions and Travel Market Analysis. Task 2.1 identified, screened, and documented recommended service alignments. The locations for in-line stations recommended in Task 2.3 (documented in the *Station Concepts and Capital Costs Technical Memorandum*) complement the proposed I-294 service plans.

As documented in this technical memorandum, the routes emanating from the Task 2.1 screenings were the top performers for unique travel markets associated with the I-294 corridor. A primary metric used in evaluating services was results of the application of a travel demand model. Finally, annual operations and maintenance (O&M) costs were estimated for the services.

## 2. Background, Prior Research

Possible express bus services were informed by the following external sources and work as part of this project.

**Pace & Illinois Tollway TIGER Grant Proposal: I-294 Express Bus Service (2009)** | Pace and the Illinois Tollway submitted a joint application for TIGER discretionary grant funding for modifying Tollway Oasis stops to also serve as park-n-ride lots for express bus service. The route and stops are shown on **Error! Reference source not found.**

**Figure 2-1. Pace TIGER Grant Application**





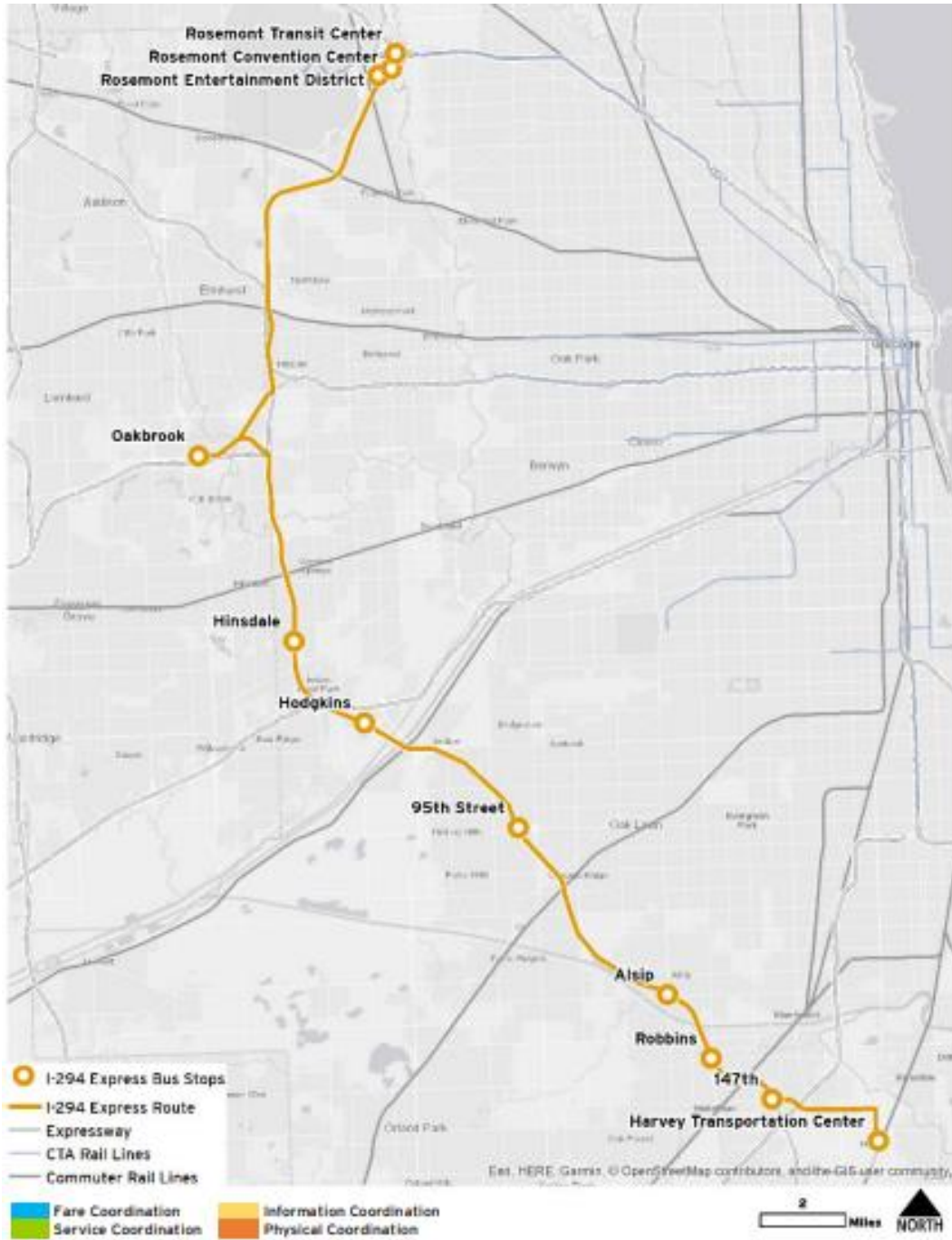
**RTA I-294 Travel Market Analysis (2016)** | This analysis was prepared by RTA during the planning for the I-294 Central Tri-State project to provide insight on potential transit ridership in the corridor. The goal of the analysis was to better understand corridor travel through demographic analysis and origin-destination mapping. The RTA also applied the Simplified Trips-on-Project Software (STOPS) travel demand model to assess potential ridership for a premium, express bus service in the corridor. (See **Error! Reference source not found.**)

**Cook County Department of Transportation and Highways (CCDOT) South Cook County Mobility Study (2019)** | Express bus service between Harvey Transportation Center and Rosemont Transit Center was modeled assuming use of the planned I-294 Flex Lanes and new park-n-ride facilities. A map of the route and stations is shown on Figure 2-3.

**Figure 2-2. RTA I-294 Travel Market Analysis**



Figure 2-3. South Cook County Mobility Study I-294 Flex Lane Express Bus



**Pace Staff Workshop** | In September 2020, a workshop was convened with Pace service planners and other Pace staff to brainstorm service scenarios as input to the Study. A summary of comments and observations include the following.

The workshop posed a series of questions using a live-polling app. Following are the questions and responses:

Question 1: Most important feature for I-294 service (top two choices)? [16 responses]

- Connect to Jobs 32%
- Connect to Transit 29%
- Bi-Directional, all-day service 16%
- High Frequency 10%
- High Speed 13%

Question 2: What should be the southern terminal for the service? [12 responses]

- Harvey Transportation Center 42%
- 103<sup>rd</sup> 33%
- Burr Ridge Pak-n-Ride 25%
- 127<sup>th</sup> / Swap-O-Rama 0%
- Other 0%

Question 3: What should be the northern terminal for the service? [13 responses]

- NW Transportation Center 23%
- Schaumburg Convention Center 8%
- Rosemont CTA Station 46%
- O'Hare Multi-Modal Facility 15%
- Busse and Higgins 0%
- Other 8%

Question 4: Most important job cluster? [9 responses]

- Oak Brook / Downers Grove 0%
- Schaumburg 0%
- Rosemont 11%
- O'Hare / Elk Grove Village 67%
- Bedford Park 0%
- Other 22%

Table 2-1 summarizes comments and observations that were made by staff during the workshop. Comments were tagged to five topics.

**Table 2-1. Comments from Pace Staff – September 10, 2020**

	Comment	Routing	Service	Home Zones	Work Zones	Travel Markets
1	build markets first, then refine service from that	X				X
2	I-294 service may become less competitive to the auto after Central Tri-State improvements are completed					X
3	housing prices are higher north compared to south, increasing demand from south origins to north destinations	X		X	X	X
4	network focus preferred rather than single location so that not all eggs in one basket	X				
5	service tailored to specific markets generally exhibit low performance, compared to direct service	X				
6	Tollway is adding new access points/interchanges	X				X
7	accessibility is a key consideration in latent demand	X				X
8	do not make routes meander; connecting routes handle low density distribution	X				
9	connections to other services will be important, especially last-mile links	X				
10	I-294 service should be used to support existing EW markets by serving as a NS connector	X				
11	bi-directional service would address need for creating a NS connector	X				X
12	since multi-seat trips will be required, provide service to locations where connections are possible	X				
13	Rosemont is good location as a decision point for riders, e.g., CTA to downtown or I-90 services to Schaumburg	X		X	X	
14	fast, frequent service should be considered only for markets where demand is certain		X			
15	low frequency services (30-60 min) typically do not perform well		X			
16	service should be provided on an all-day basis		X			
17	market evaluation needs to consider both when and where people travel	X	X			X
18	many transit markets involve shift work with non-traditional start/end times		X			X
19	service from Harvey to O'Hare/Rosemont was tested in 2009 (Route 889); it was cancelled after 4 mons, never attracting more than 30 passengers per day	X		X	X	X
20	plans for the South Division Garage/Campus at Dixie & 153rd could be a south terminal opportunity	X		X		
21	area near new Amazon facility in Markham (159th east of I-294) could be south terminal opportunity	X		X	X	
22	the O'Hare Multi-Modal transit facility is nearing capacity of available bus bays, limiting usefulness as a terminal	X			X	

**Existing Conditions** | The Task 1 report documenting existing and future transit in the I-294 Study corridor (*Transit Service Existing Conditions Report*, October 2020) was useful in understanding base conditions as well as to identify services that could connect to potential express bus services. In addition, the task performed an evaluation of eight Pace routes that operate in or near I-294. A summary of key findings that were thought to be transferable to the formulation of express bus service recommendations follows.

Based on the analyses, notable origins for the selected routes are:

- CTA rail stations,
- Harvey Transportation Center, and
- Blue Island Park-n-Ride (127th Street & Kedzie Avenue).

Riders at these origins are generally transferring from other services. Many riders using these routes are actually completing longer trips from elsewhere in the region. Notable travel markets for the selected routes are:

- Traditional 9-5 commuters, with destinations in Oak Brook, Downers Grove, and Schaumburg,
- Shift workers destined for industrial and warehouse employment areas west of O'Hare (i.e., Elk Grove Village, Bensenville, Wood Dale, and Itasca) or to retail employment in Rosemont,
- All-day travel on Mannheim and LaGrange Roads, and
- UPS Hodgkins workers.

General findings related to individual routes are summarized as follows:

- Route 223 Elk Grove-Rosemont CTA Station: An important connection between the CTA and jobs west of O'Hare and Elk Grove Village. Market is fairly robust in both directions at multiple times during the day.
- Route 330 Mannheim-LaGrange Roads: Ridership data supports the conclusion that riders are traveling shorter distances and not all are destined for major activity centers at Rosemont or O'Hare.
- Route 395 95th/Dan Ryan CTA-UPS Hodgkins Limited: Due to shift work at the UPS facility, not likely compatible with future service on I-294.
- Route 757 Oak Park-Schaumburg Limited: Connects the CTA Forest Park and CTA Harlem/Lake Stations with Schaumburg. The most productive part of this route is along Busse Road and at Continental Towers (Golf Road / New Wilke Road, in Rolling Meadows).
- Route 877 Harvey-Downers Grove Limited and Route 888 Homewood-Naperville Limited: Oriented to office and service sector jobs along the I-88 corridor. On-time data reveal an issue when exiting I-294, but able to make up time along 22<sup>nd</sup> Street and Butterfield Road.
- Route 890 Chicago Heights-UPS Hodgkins Limited: Due to shift work at the facility, Route likely not compatible with other future service on I-294.
- Route 895 Rosemont-Schaumburg Express: Only a couple of locations in Schaumburg have high activity: Northwest Transportation Center and the end of the line along Algonquin Road. Suggests auto-oriented development and the accompanying pedestrian connectivity issues make Schaumburg unattractive to riders in its current state. Given the high number of trips destined for this cluster, Pace should continue to push for better pedestrian accommodations to improve the transit mode share.

**Market Analysis** | The *Market Analysis Technical Memorandum*, October 2020, provides a wealth of socio-economic and travel flow data that served as a foundation for assessing the need for new and improved transit services in the Study corridor.

# 3. Service Design Principles and Approach

The general approach to developing service concepts for evaluation is to:

1. Identify terminals,
2. Design route alignments that efficiently connect terminals using I-294, and
3. Identify intermediate major expressway stations and local stops, as applicable.

The following lists design principles and other considerations that were used to help guide the service planning.

## Alignment/Directness

- Because the project Study Area is within a part of the metropolitan area that includes several major activity centers, multiple routes should be developed to represent a program of services that will serve as many destinations as feasibly possible.
- To the extent possible, provide direct service, minimizing route deviations.
- As the targeted markets will involve longer-distance trips, service should seek to attain higher speeds, and be cognizant of comparative automobile travel times.

## Type of Market Served

- Service design should focus primarily on the work commute market, but also consider opportunities for other travel markets in the corridor.
- Travel markets that exhibit the strongest demand should be given higher priority.
- An overarching consideration will be Pace's goal of supporting an inclusive transit system that provides low cost connections to social and economic opportunities (*Strategic Vision Plan, Driving Innovation*, Pace, 2021). This goal is further supported by the following objectives:
  - Continue to ensure equitable access to high-quality transit.
  - Continue to prioritize communities with higher levels of need and those traditionally disadvantaged.
  - Plan new and adjust existing services to fit community context.

## Service Plan/Service Levels

- Express services that use I-294 should be viewed as trunk lines as part of a larger network of transit services.
- Service levels should provide at least 30-minute frequencies, be bi-directional, and operate on an all-day basis.
- Service should operate during weekdays; potential for weekend service where travel markets warrant consideration should be explored.

## Connections

- Connections with other Pace services should be maximized.
- Connections to Pace's Near-Term Priority Pulse network and Pace Express network Rapid Transit Program services should be prioritized.

- Connections to CTA and Metra rail service should be prioritized where high frequencies of service exist and pedestrian infrastructure allowing safe transfers between transit modes are feasible.
- Use of last-mile services are preferred over express services that meander to serve destinations.
- Opportunities to use existing (and develop new) park-n-ride facilities should be considered to expand the catchment area of origin riders (i.e., from place of residence).

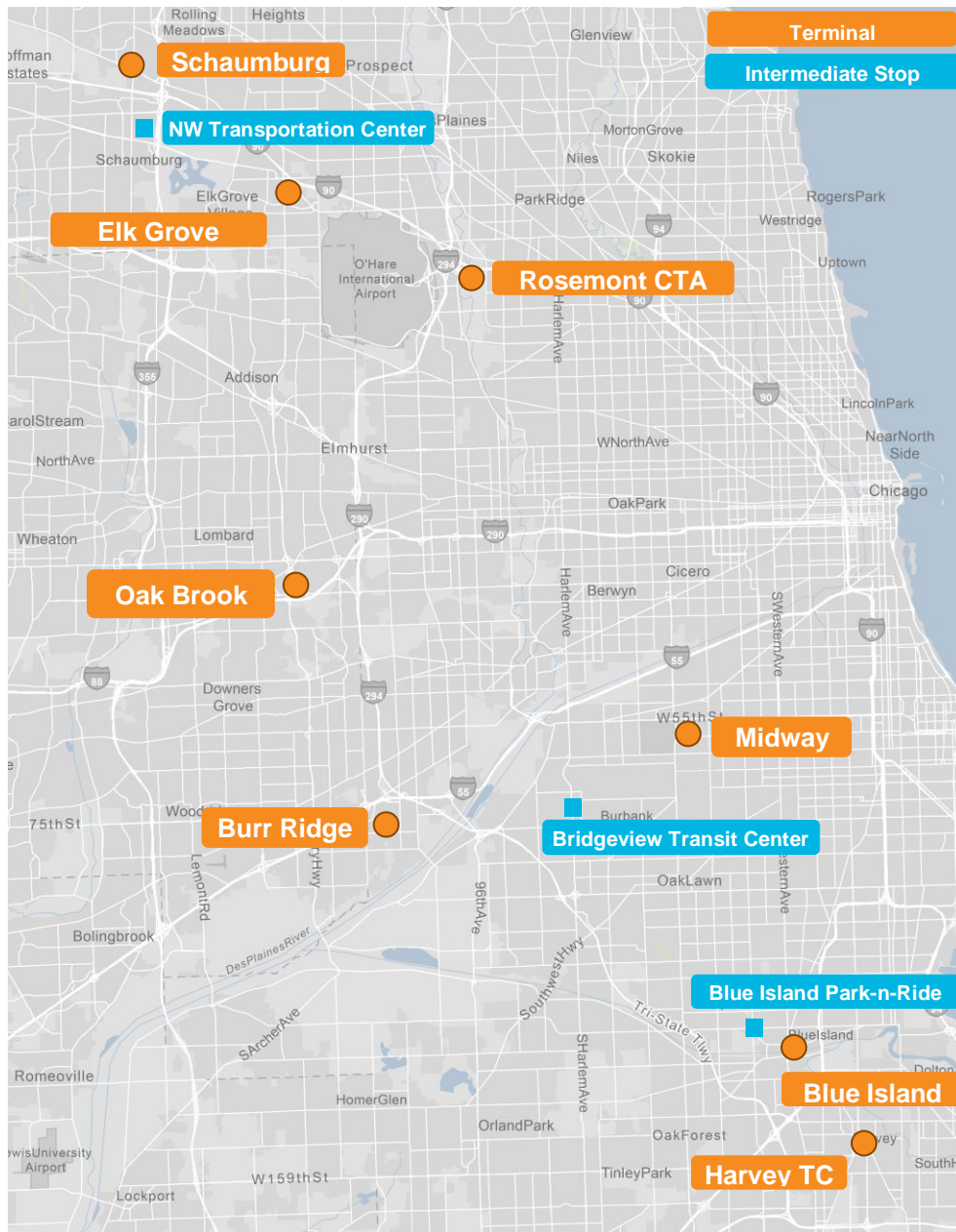
# 4. Service Designs

As stated in the previous section, the service planning approach involved developing routes that connect major terminals and use I-294 for some portion. The following describes terminals, alignments, and intermediate stops to develop a set of services that are later evaluated to identify the most deserving service alternatives to advance. In addition to identifying candidate express bus routes, assumptions on service parameters are provided.

## 4.1 Terminals

Eight terminal locations were identified, as shown on Figure 4-1. Potential major off-line intermediate stops shown include the Northwest Transportation Center, Bridgeview Transit Center, and Blue Island Park-n-Ride.

Figure 4-1. I-294 Express Bus Candidate Terminal Locations





The following describes the prospective terminals,<sup>1</sup> ordered from south to north,

**Harvey Transportation Center** | This intermodal transportation center is located immediately west of the Metra Electric District (MED) Harvey Station. The Center serves eleven Pace routes as of April 2021. Covered waiting areas and parking for 71 automobiles are provided. Pace improvements to the facility have been programmed. Pace and Metra are partnering to redesign both the Pace Transit Center and Metra Harvey Station to better facilitate transfers between both agencies' services, in coordination with IDOT and the City of Harvey.

**Blue Island** | The terminal would be adjacent to the Metra Rock Island District (RID) Blue Island-Vermont Station and the MED Blue Island Station on Vermont Street. The location is served by two Pace routes and commuter parking is available for a fee. Service from the Blue Island terminal would also use the **Blue Island Park-n-Ride** located near 127th & Kedzie Avenue, approximately 1½ miles north and west of the terminal. In addition to connecting with two Pace routes, the site is supported by 63 parking spaces.

**Burr Ridge Park-n-Ride** | This site is located just south of I-55 east of County Line Road in Burr Ridge. The facility serves Pace I-55 Bus on Shoulder routes as well as a feeder route to the Metra Hinsdale BNSF Station, and includes 82 parking spaces. Pre-COVID-19, this parking lot was routinely at or near capacity. Pace has had preliminary discussions with the Village to expand the parking facility.

**Bridgeview Transit Center** | This facility is at 71st Street & Harlem Avenue in Bridgeview. Parking is shared with the SeatGeek Stadium.

**Midway Transit Center** | Located at Chicago Midway International Airport, the bus terminal is adjacent to the CTA's Orange Line terminal and provides connections to both Pace and CTA bus routes. Paid parking is also available.

**Oakbrook Center** | Current Pace services allow for transfers at the Macy's Oakbrook Center entrance. A terminal or major stop to serve future Cermak and Roosevelt Pulse Lines may be developed.

**Rosemont Transit Center** | This Pace Transit Center is adjacent to the Rosemont Station of the CTA Blue Line on River Road. Connections with numerous Pace routes are possible. Available paid parking is shared with CTA Blue Line users.

**Elk Grove** | Candidate express routes could terminate at several areas within this major employment center on the west side of O'Hare Airport. While no physical bus terminal exists, proposed alternative express bus services end at Busse Road and IL-390, as well as Busse and Higgins Roads.

**Schaumburg** | A service end point is envisioned north of I-90 near Meacham Road in Schaumburg, adjacent to the Zurich Insurance headquarters and the in-construction Veridian development. In addition, candidate routes would serve the Pace **Northwest Transportation Center** about 1½ miles south near Woodfield Mall on Kimberly Drive. The Center serves eight Pace routes and is supported by 122 parking spaces. Pace is in the process of expanding the parking capacity and implementing Americans with Disabilities Act (ADA) improvements.

## 4.2 Initial Identification and Screen of Alternatives

All possible combinations of terminal connections were identified by creating the matrix shown on Figure 4-2. Since directionality is not a factor in defining routes, only the combinations of terminals on the lower left side of the diagonal were considered (i.e., non-gray shaded cells).

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<sup>1</sup> Note that the number of Pace bus routes cited serving terminal locations include some services that have been suspended due to COVID-19. There was no information available as of this writing on when these services would be restored.

The green cells are combinations of terminals that are recommended to advance; assigned alternative route numbers are denoted. Reasons for routes to not advance are noted and include such factors as I-294 not being a logical route to connect two terminals, limited demand, or terminal connections already served.

**Figure 4-2. Initial Screen of all Terminal Connecting Routes**

	Harvey	Blue Island	Burr Ridge	Midway	Oak Brook	Rosemont	Elk Grove	Schaumburg
Harvey								
Blue Island	I-294 doesn't connect							
Burr Ridge	limited demand	limited demand						
Midway	8	I-294 doesn't connect	I-294 doesn't connect					
Oak Brook	10	6, 11	indirect routing	already served				
Rosemont	1, 1a, 2	5, 6	9	already served	6a			
Elk Grove	1, 2, 4	7	limited demand	limited demand	limited demand	1, 2		
Schaumburg	3, 4	7	limited demand	limited demand	limited demand	already served	already served	

### 4.3 Alignments and Stops

Thirteen candidate routes were identified from the initial screen and are described in this section. The numbers assigned to alternatives represent travel demand model runs that are discussed later in the document.

#### Alternative 1 - Harvey-Elk Grove (via Rosemont)

##### Route

This alternative assumed a route that would operate between the Harvey Transportation Center and Rosemont, continuing west to serve the warehouse and light industrial area in Elk Grove west of O'Hare Airport. At the south end, service would operate on local roadways using 154<sup>th</sup> Street from the Harvey Transportation Center, Wood Street to 159<sup>th</sup> Street, and accessing I-294 at 159<sup>th</sup> Street. An alternative to this routing would be to access I-294 at the 147<sup>th</sup> Street interchange. Should this service advance to implementation, Pace service planners should review this alignment option.

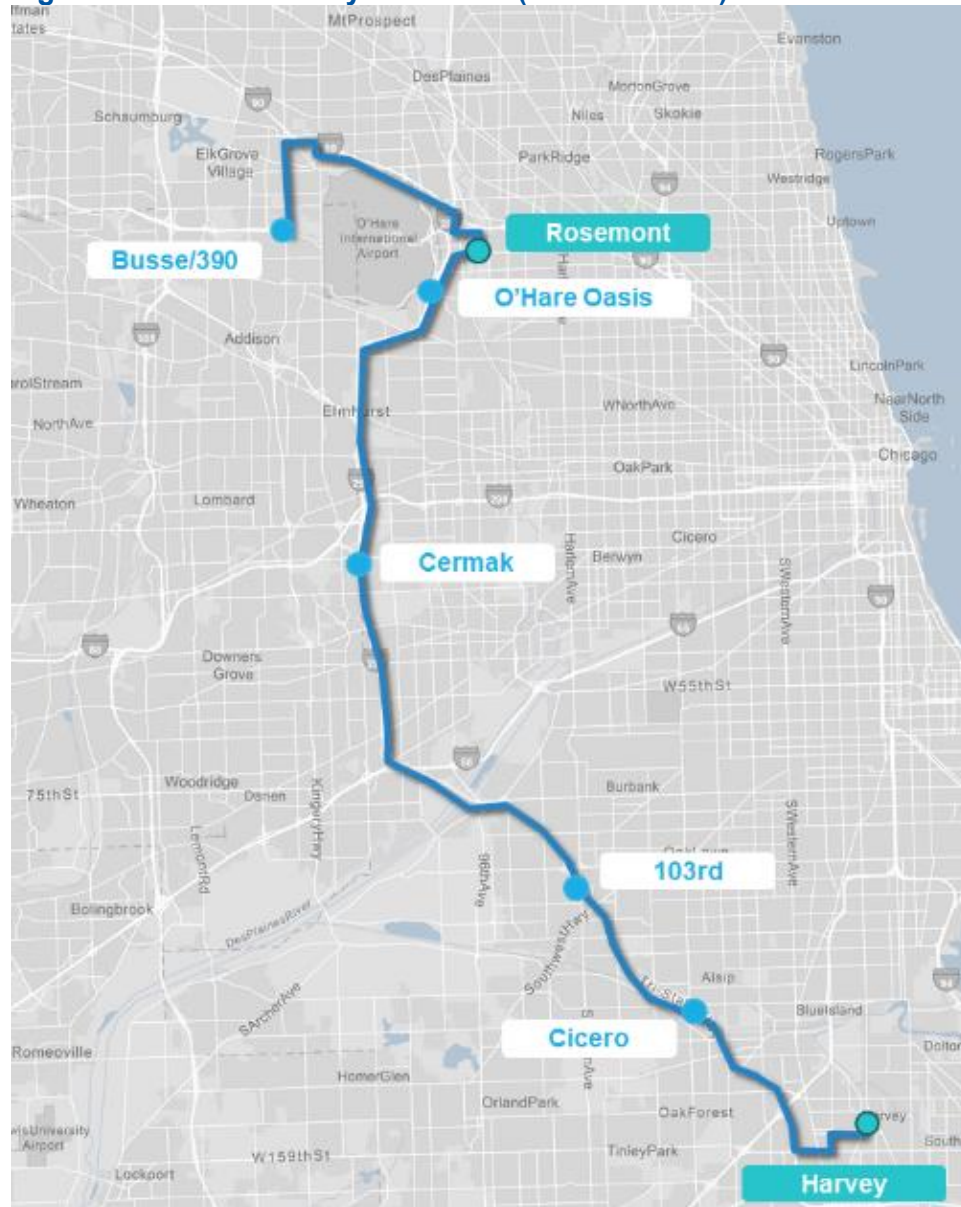
##### Stops

The service would make local stops for the segment between the Harvey Transportation Center and the I-294/159<sup>th</sup> Street interchange, including a stop at the new Amazon Warehouse in Markham near Western Avenue and 159<sup>th</sup> Street.

The initial design assumed in-line station stops at Cicero Avenue,<sup>2</sup> 103<sup>rd</sup> Street, Cermak Road, and the former O'Hare Oasis in Schiller Park.

The route would use the I-294/I-190 ramps to access the Rosemont Transit Center. After the Rosemont stop, the route would use local roadways, and make regular stops westward to Elk Grove, terminating at Busse Road and IL-390. If advanced, potential redundancy with the existing Route 223 would need to be assessed. Alternative 1a (see next section) provides one option for addressing this issue. Figure 4-3 illustrates the alignment and stop locations.

**Figure 4-3. Alt. 1 - Harvey-Elk Grove (via Rosemont)**



<sup>2</sup> As indicated in the *Station Concepts and Capital Costs Technical Memorandum*, it was recommended that the in-line station at Cicero Avenue not advance for further study, although it was judged physically feasible. The elimination of the Cicero in-line station holds true for all following alternative descriptions, though it is still included in this documentation as it remained viable at the time this analysis was conducted.

## Alternative 1a - Harvey-Rosemont

### Route

This alternative was an outgrowth of the review of Alternative 1, addressing the concern for duplicating Pace Route 223, and involved keeping the same alignment but truncating the north end at the Rosemont Transit Center. This variant also assumed that Elk Grove would probably be better served from points south by routing service around the south end of O'Hare.

### Stops

The stops between Harvey and Rosemont would be the same as Alternative 1. See Figure 4-4.

Figure 4-4. Alt. 1a - Harvey-Rosemont



## Alternative 2 - Harvey-Rosemont (via Busse)

### Route

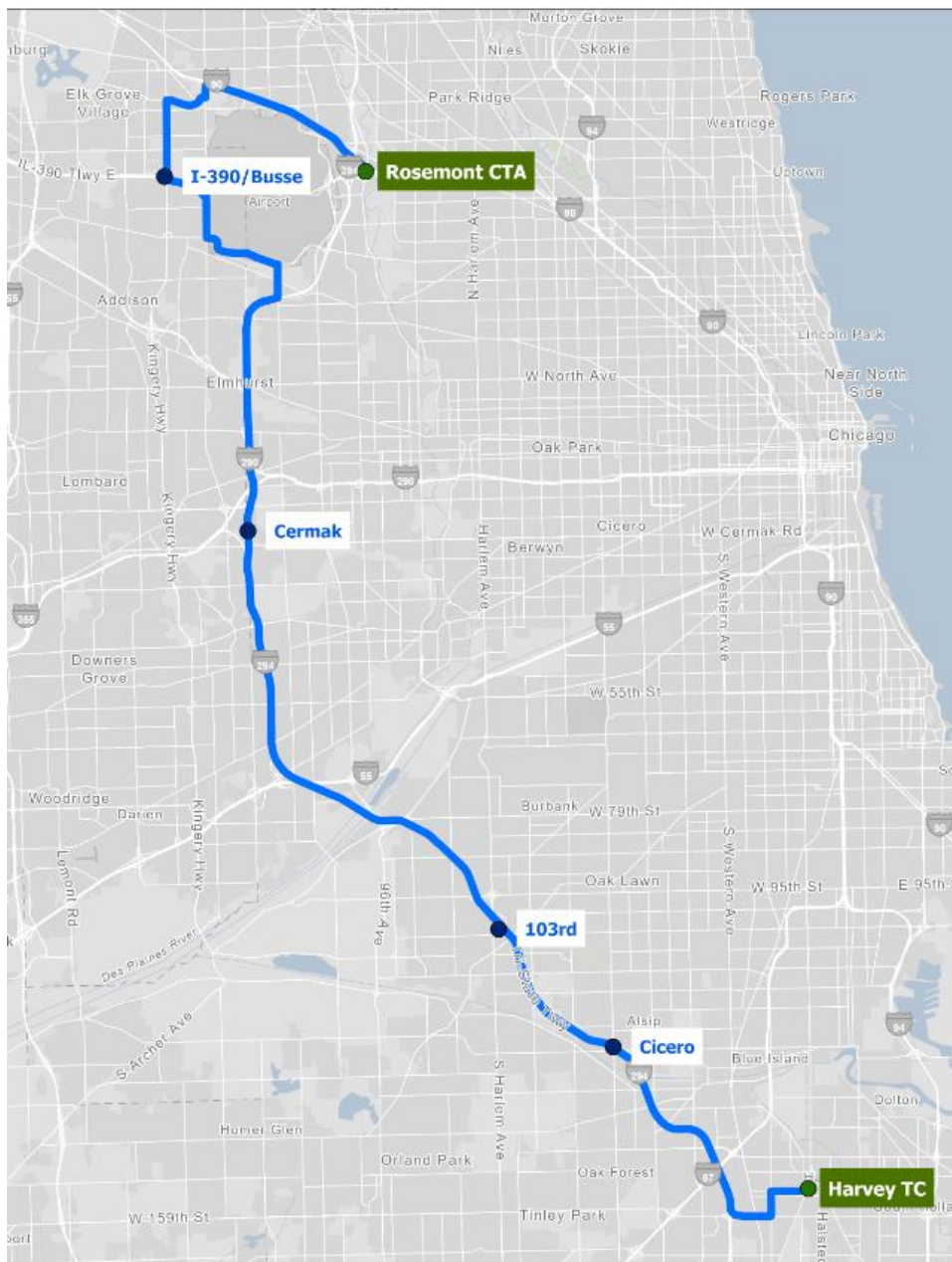
This service was similar to Alternative 1, except the pattern at the north end would serve Elk Grove (Busse) first, then operate clockwise around O'Hare Airport to terminate at the Rosemont CTA Blue Line Station. The approach to Elk Grove would use the programmed I-490 project, which is expected to be completed by the end of 2025.

### Stops

The stops between Harvey and Cermak would be the same as Alternative 1, assuming in-line station stops at Cicero Avenue, 103<sup>rd</sup> Street, and Cermak Road along I-294.

From I-490, the routing would use IL-390 to Busse Road, then use the same local streets and stops as Alternative 1 to terminate at Rosemont Transit Center. See Figure 4-5.

Figure 4-5. Alt. 2 - Harvey-Rosemont (via Busse)



### Alternative 3 - Harvey-Schaumburg (via I-290)

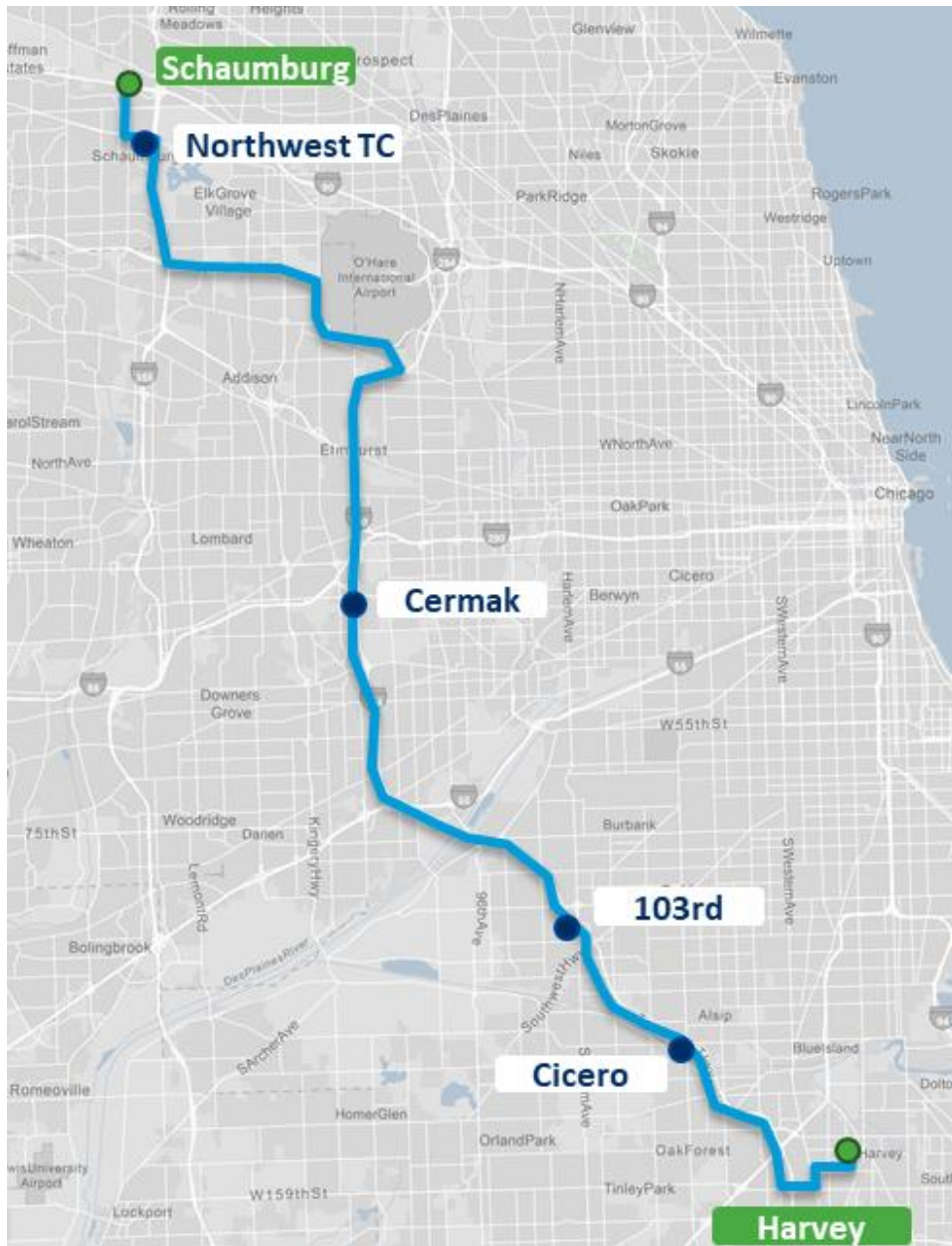
#### Route

Alternative 3 has the same alignment as Alternative 2 to I-490 but continues west on IL-390 to I-290 until it exits and reaches the Northwest Transportation Center, where the alignment would continue north on Meacham to the north side of I-90.

#### Stops

Alternative 3 has the same stops as Alternative 2 until it leaves I-294, after which its next stop is the Northwest Transportation Center (after exiting I-290). The service would then make local stops en route until it reaches the terminal on Meacham just north of I-90. See Figure 4-6.

Figure 4-6. Alt. 3 Harvey-Schaumburg (via I-290)



## Alternative 4 - Harvey-Schaumburg (via Busse)

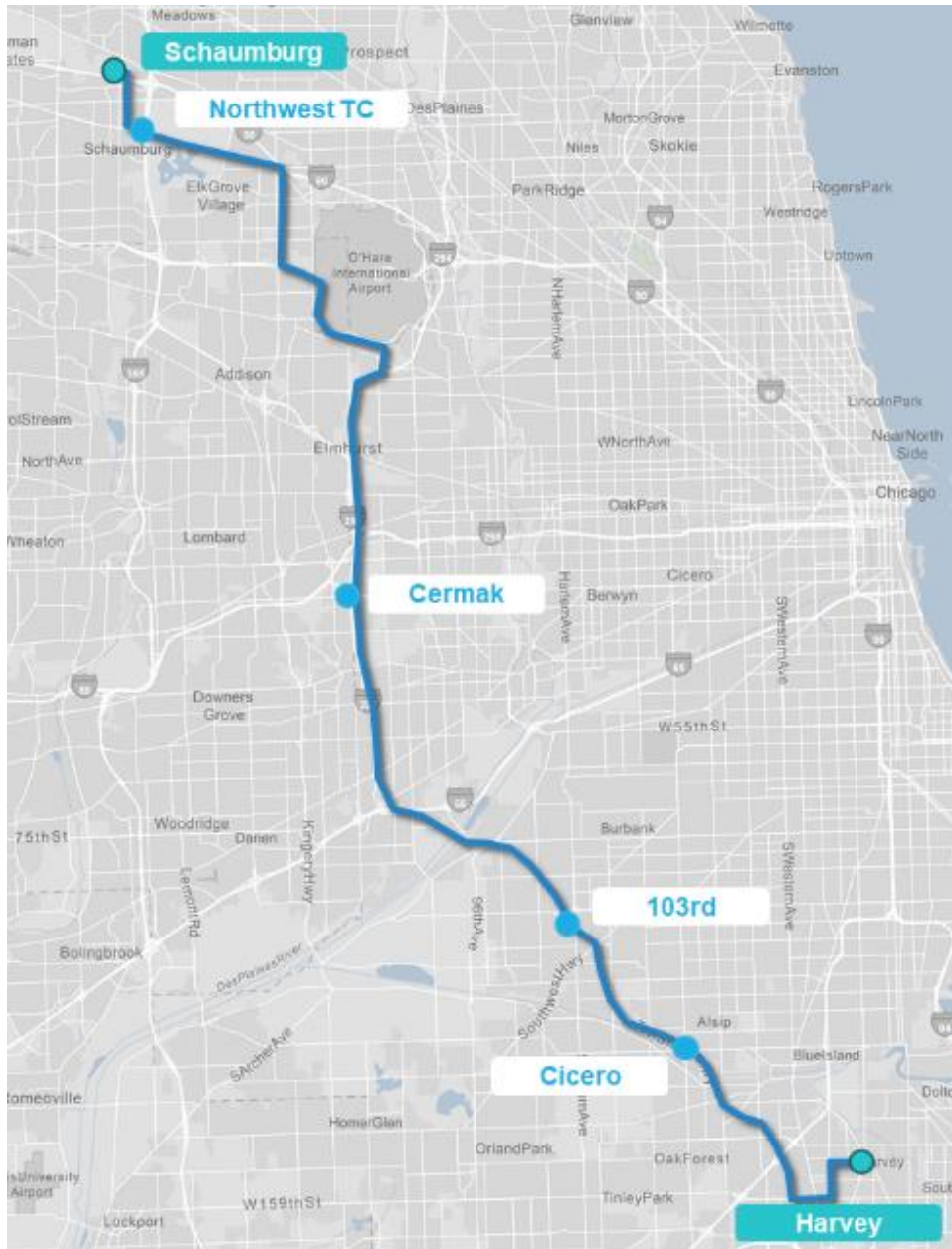
### Route

This is a variation of Alternative 3, but instead of operating express on I-390 and I-290, service would operate locally in Elk Grove, continuing north to the Northwest Transportation Center and Meacham/I-90 in Schaumburg.

### Stops

Alternative 4 has the same stops as Alternative 3, except local stops would be made from IL-390/Busse Road north. See Figure 4-7.

Figure 4-7. Alt. 4 - Harvey-Schaumburg (via Busse)



## Alternative 5 - Blue Island-Rosemont

### Route

This alternative would provide express service between Blue Island and Rosemont. The route would originate at the Metra RID and MED stations on Vermont Street in Blue Island and travel along Vermont Street, Western Avenue, and 127<sup>th</sup> Street and enter I-294 at the Cicero Avenue/127<sup>th</sup> Street interchange. After accessing I-294, it would use the same alignment as Alternative 1a to the Rosemont Transit Center.

### Stops

Between the terminal at the Metra RID and MED stations and I-294, the service would make local stops, including the Blue Island Park-n-Ride. After entering I-294, the stops would be the same as Alternative 1a to the Rosemont Transit Center (103<sup>rd</sup>, Cermak, O'Hare Oasis). See Figure 4-8.

Figure 4-8. Alt. 5 - Blue Island-Rosemont





## Alternative 6 - Blue Island-Rosemont (via Oakbrook Center)

### Route

This route is similar to Alternative 5 Blue Island-Rosemont, but with a deviation from I-294 to serve the Oakbrook Mall. This would provide more direct service to Oak Brook compared to the use of the Cermak in-line stop at the far east end of the community.

### Stops

In addition to the stops described in Alternative 5 (excluding Cermak in-line), local stops would be made in and near the Oakbrook Center. See Figure 4-9.

Figure 4-9. Alt. 6 - Blue Island-Rosemont (via Oakbrook Center)



## Alternative 6a - Oakbrook Center-Rosemont

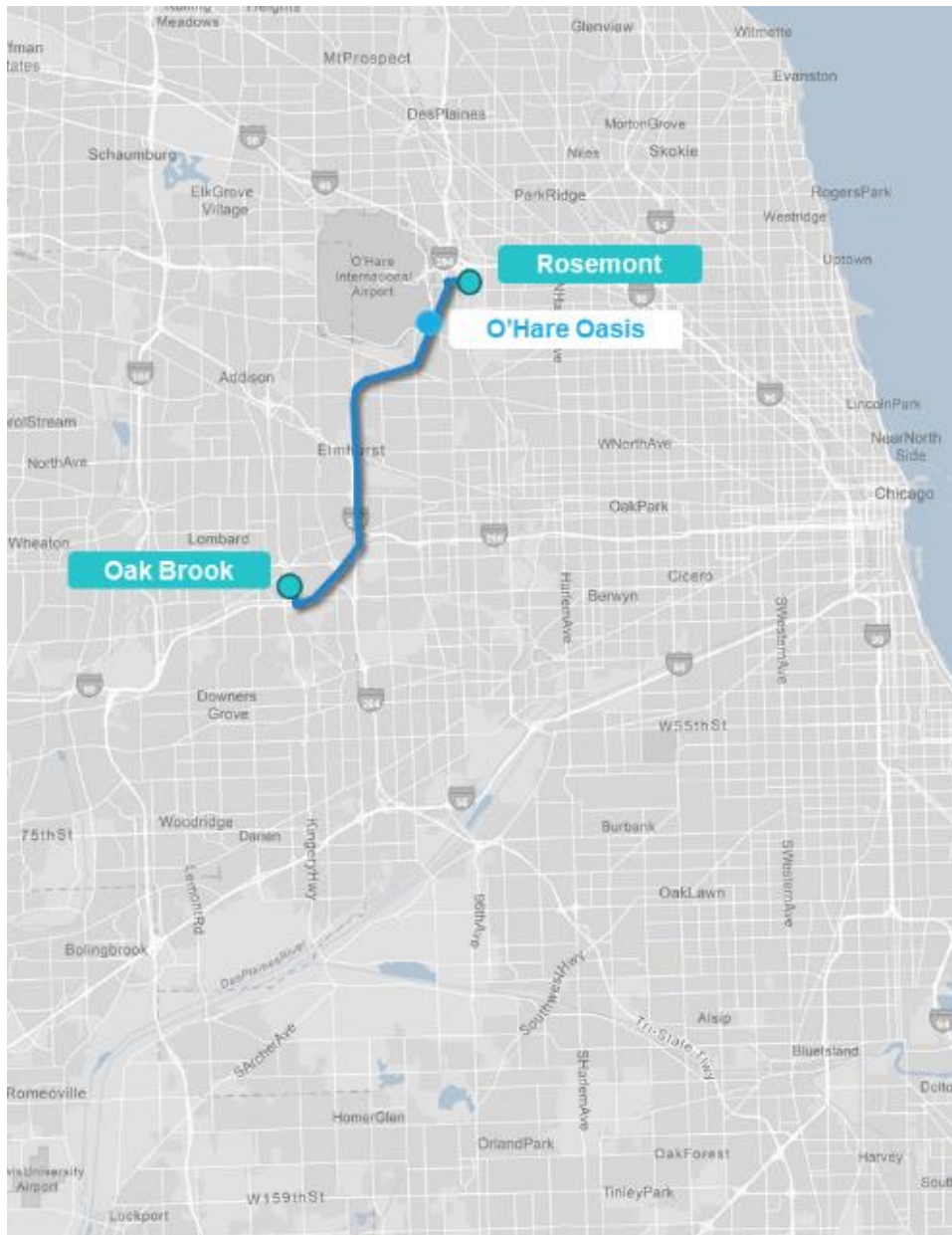
### Route

To balance the disadvantage of deviating the Blue Island-Rosemont route to serve Oakbrook Center with the advantage of direct service to the Center, an alternative was configured that connected Oak Brook and Rosemont with its own route. The alignment between Oak Brook and Rosemont Transit Center is the same as Alternative 5.

### Stops

The service would include local stops in Oak Brook, the O'Hare Oasis in-line stop, and Rosemont Transit Center. See Figure 4-10.

**Figure 4-10. Alt. 6a - Oakbrook Center-Rosemont**



## Alternative 7 - Blue Island-Schaumburg (via Busse)

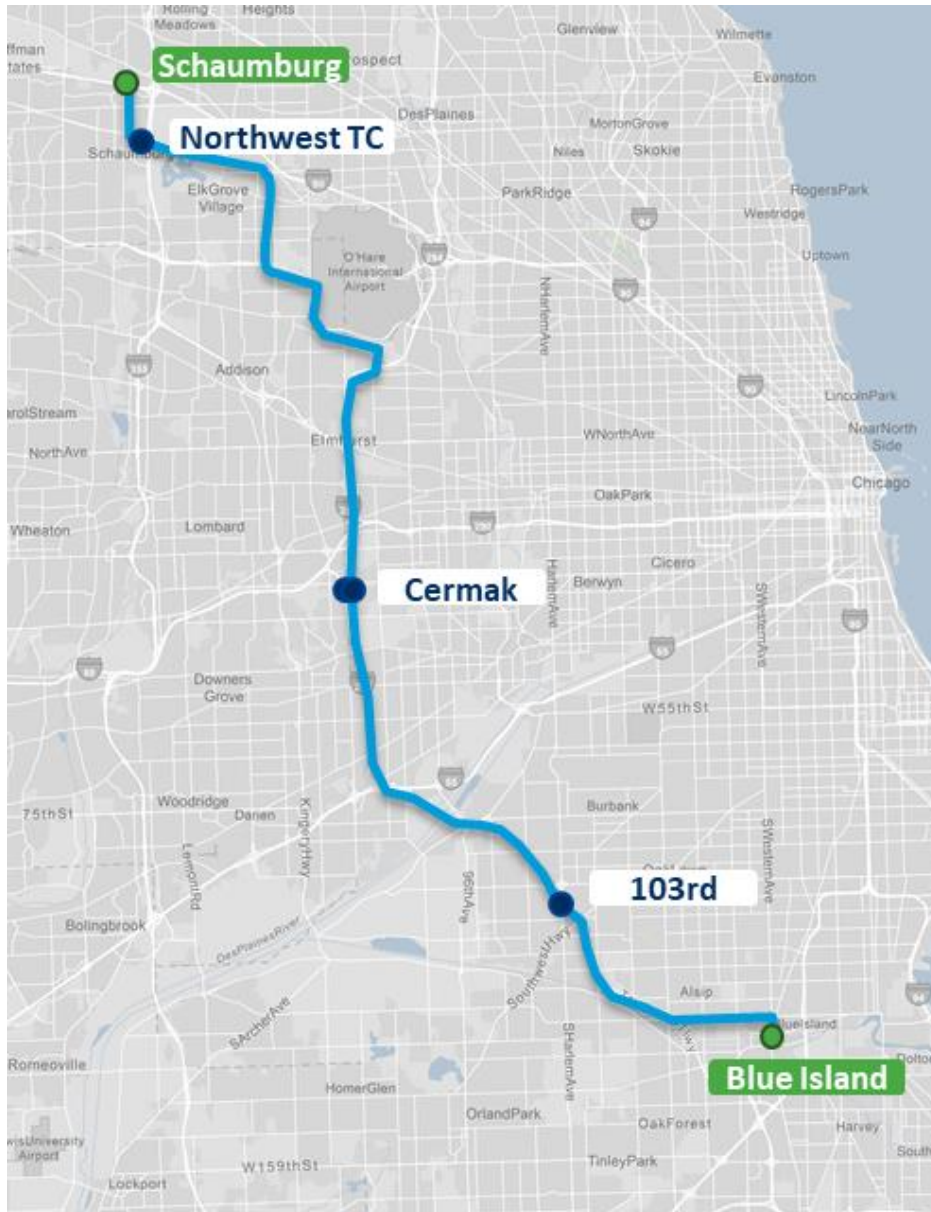
### Route

Alternative 7 is similar to Alternative 4, serving the Elk Grove (Busse Road) and Schaumburg markets from Harvey, but instead originating in Blue Island.

### Stops

The service could include local stops between the Blue Island terminal and I-294 (as in Alternatives 5 and 6), in-line stations at 103<sup>rd</sup> and Cermak, and local stops from IL-390/Busse Road north to the terminal at Meacham Road and I-90. See Figure 4-11.

Figure 4-11. Alt. 7 - Blue Island-Schaumburg (via Busse)



## Alternative 8 - Harvey-Midway

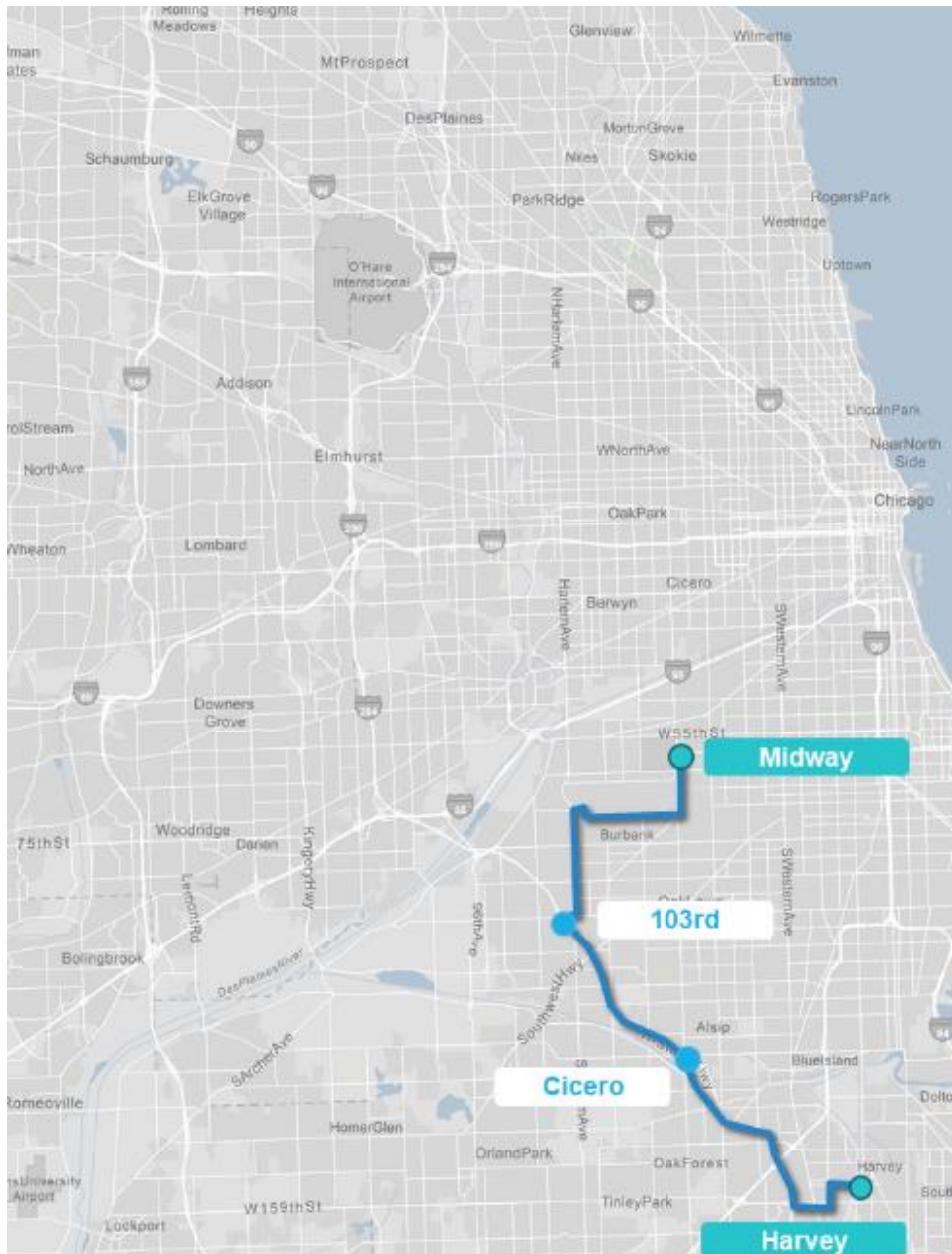
### Route

This alternative would follow the same alignment as other Harvey terminal options to access I-294 at 159th Street. Just north of 103rd Street, the route would leave I-294 and follow Harlem Avenue northward to the Bridgeview Transit Center, then serve the Bedford Park area, and terminate at the Midway Transit Center.

### Stops

The service would make local stops between the Harvey Transportation Center and the I-294/159th Street interchange and serve in-line stations at Cicero and 103rd Street. After leaving I-294, buses would make local stops before terminating at Midway Airport. See Figure 4-12.

Figure 4-12. Alt. 8 - Harvey-Midway



## Alternative 9 - Burr Ridge-Rosemont

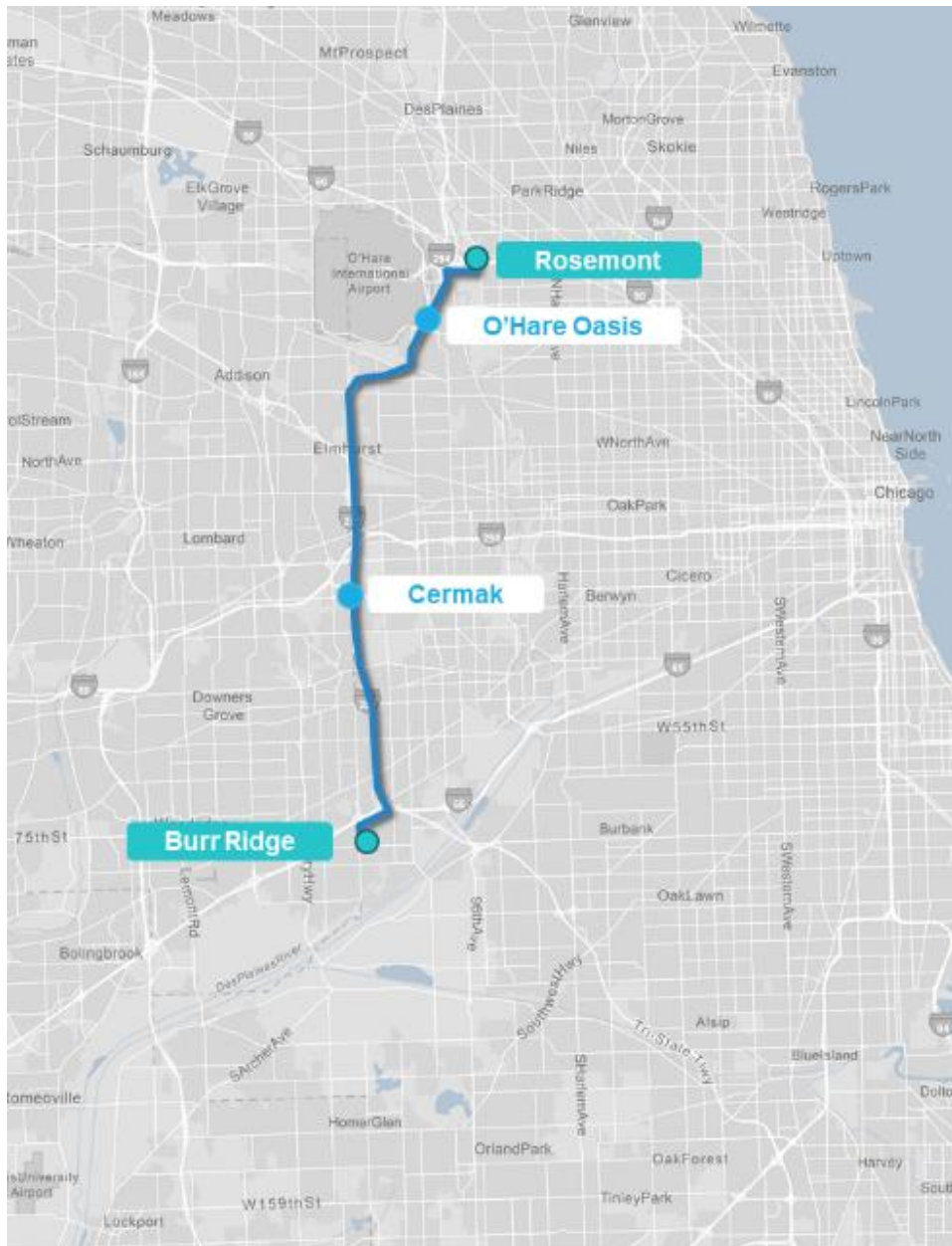
### Route

Alternative 9 route begins at the Burr Ridge Park-n-Ride, which currently supports the I-55 Bus on Shoulders express bus services. After entering I-294 at I-55, the alignment and stops would be the same as Alternative 1a.

### Stops

This alternative is bookended by terminal services at Burr Ridge Park-n-Ride at the south end and Rosemont Transit Center at the north. In-line stations on I-294 include Cermak and O'Hare Oasis. See **Error! Reference source not found.**

Figure 4-13. Alt. 9 - Burr Ridge-Rosemont



## Alternative 10 – Harvey-Oak Brook

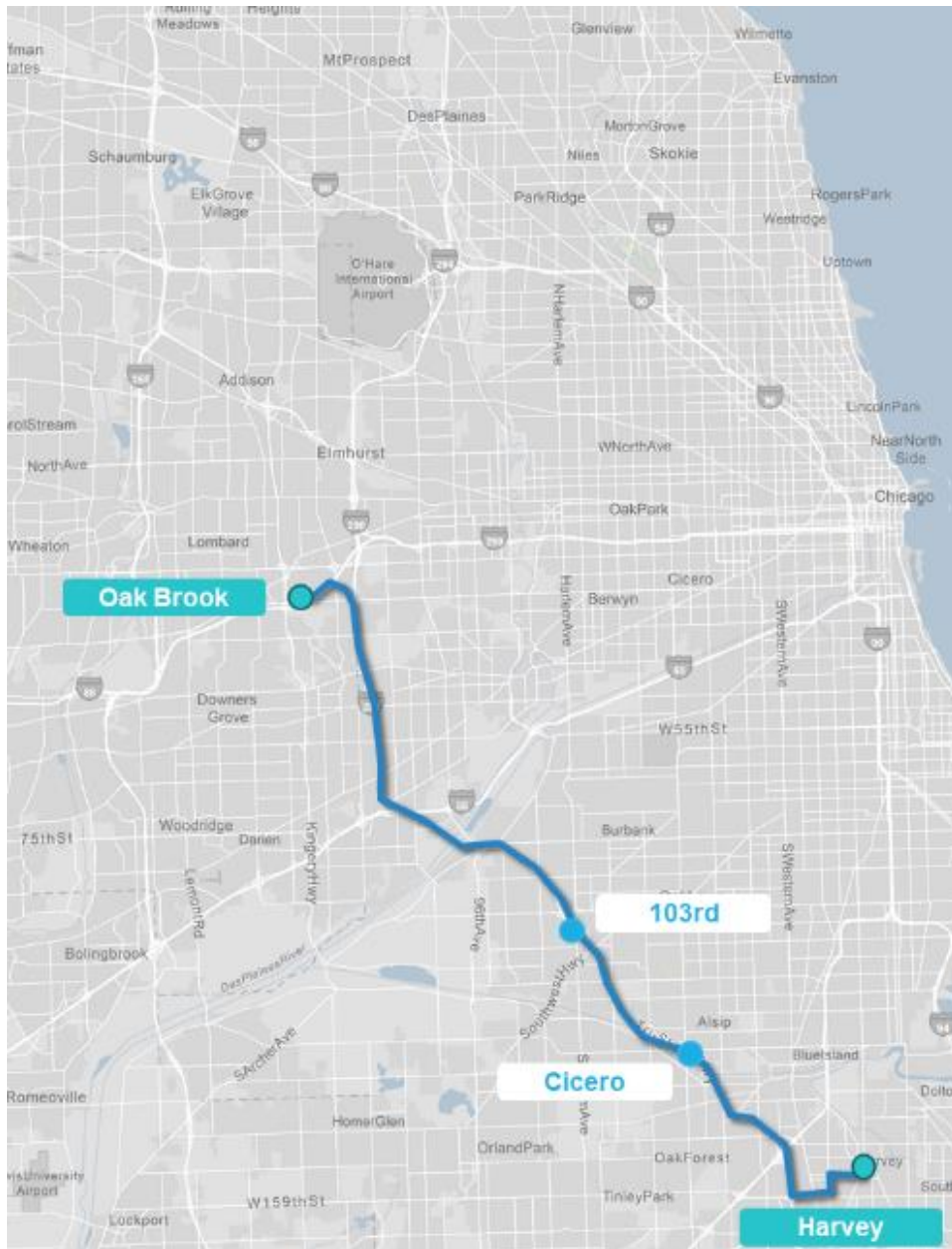
### Route

This service would be a complement to Alternative 6a, Oak Brook-Rosemont, but with a south terminal at the Harvey Transit Center. Adding this route to the Oak Brook terminal would further the location as a major transit hub. The alignment and stops would be the same as the southern half of Alternative 1a: beginning at Harvey Transportation Center, entering I-294 and traveling to the I-88 ramp, then exiting at 22<sup>nd</sup> Street and Spring Road in Oak Brook.

### Stops

The major stops would be the same as the southern half of Alternative 1a, as shown on Figure 4-14. Local stops would be made between Harvey Transportation Center and I-294, as well as in and near the Oakbrook Center.

Figure 4-14. Alt.10 - Harvey-Oak Brook



## Alternative 11 - Blue Island-Oak Brook

### Route

This alternative is a variation to Alternative 10, with the south terminal at Blue Island and not Harvey. The alignment between I-294 and Blue Island is the same as Alternative 7.

### Stops

This alternative would include only one in-line station (103<sup>rd</sup>). Local stops would be made between each terminal and entering/exiting I-294. See Figure 4-15.

**Figure 4-15. Alt. 11 – Blue Island–Oak Brook**



## 4.4 Service Assumptions

The relative attractiveness of the express bus service will be a function of the level and quality of service provided. For the purpose of this Study, uniform service parameters were assumed to enable a fair assessment of impacts across the thirteen candidate routes. While the assumption of relatively frequent service over a comparatively long service day should meet the travel time requirements of most travel markets being served by the proposed routes, there may be cases involving travel outside of these parameters. An example would be for employers with multiple shifts, including a third shift (generally, midnight to the early hours of the morning). For services selected for implementation, the level of service will be reviewed for the specific travel markets served and tailored to the demand factors of those markets and other considerations.

### Bi-directional Service Frequencies

- Weekday 5:00 am to 7:00 pm: 30 minutes
- Weekday 7:00 pm to 11:00 pm: 60 minutes

### Service Span

- Weekday 5:00 am to 11:00 pm (18 hours)

### Travel Time

Bus service travel times were estimated by applying a planning-level methodology, which incorporated both in-motion travel times and dwell times associated with each intermediate station.

In-motion travel times were estimated using the Google Maps Directions app. Each travel time was recorded as a low-high range for four time periods (AM Peak, Midday, PM Peak, and Evening) across both northbound and southbound directions. The travel time model assumed that buses would stay in general purpose lanes and cruise at the posted speed limit of 55 mph. When speeds dropped below 55 mph, it was assumed that the bus would migrate to the Flex Lane and travel at a maximum speed of 45 mph.

It should be noted that Google travel times can be imprecise and represent average conditions for a location and time period. The Study team noted that some travel times likely represented speeds beyond the posted speed limit. However, the difference between posted and exceeded speed would change the travel time less than one minute for a 60+ minute one-way trip. Pace service planners will review and update travel times when implementation takes place.

As noted above, the methodology also included +1 minute for dwell times at stations. This time included the acceleration and deceleration of the bus vehicle, along with passenger boarding/alighting. This planning-level estimate is based on an average across all routes and would be reviewed and potentially adjusted by Pace prior to implementation of I-294 service.



## 5. Service Evaluation

The end product of this Study is to provide 1) conceptual plans for three in-line bus stations and 2) a menu of express bus service routes that Pace could implement. This technical memorandum is addressing the latter, with the intent of identifying at least one service for each of the unique travel markets studied.

A key evaluation metric is the output from the application of a travel demand model. A description of the modeling tool used, and the results are provided in this section. A final evaluation is also provided, including a list of alternatives recommended.

### 5.1 Travel Demand Modeling

The Federal Transit Authority (FTA) developed the Simplified Trips-on-Project Software (STOPS) model for project sponsors to evaluate and rate proposed major transit projects. The model considers zone-to-zone travel markets, uses a conventional mode choice model to predict zone-to-zone transit travel, and assigns trips to guideways in the transit network. The model uses worker flows (i.e., residence and work locations) from the Census Transportation Planning Package (CTPP). To represent the transit system in the model, data from the General Transit Feed Specification (GTFS) from local transit providers are used. It also relies on the regional travel model for estimates of roadway travel times and distances.

The version of the STOPS model applied was developed for the Cook County Department of Transportation and Highways' South Cook Mobility Study. The starting point for the South Cook model was a STOPS model developed by the RTA, which used a consistent set of inputs to represent a "base case" scenario within the STOPS environment for the northeastern Illinois region. Cook County's consultant made a supplemental calibration of the model that included subdividing modeling districts in south Cook County and the I-294 corridor (i.e., from 12 districts in the RTA version to 39 districts). The model forecasted passenger boardings for 2040, using Chicago Metropolitan Agency for Planning (CMAP) adopted 2040 socio-economic forecasts.

The alternative alignments and service assumptions described in Section 4 were the inputs used in the model. Also, no changes to existing Pace services were made. While it was assumed that adjustments or even complete replacements of current service will be likely, it was felt more important to test new service with the current network in place to better inform possible changes to existing service later. Each alternative was applied as a separate model run. The key model output was 2040 passenger boardings, which represent the total estimated passengers entering vehicles for an entire service day. Other outputs included: boardings by stop, boardings by access mode (i.e., walk, kiss-n-ride, park-n-ride, and transfer), and change in boardings for existing services.

Regarding the possible effects of COVID-19 on future travel, the modeled forecasts were based on conditions in 2040. While the model was calibrated using pre-pandemic inputs, it is too soon to say how, or if, travel will change once the pandemic is over. Should there be long-term changes in the use of transportation, there will be a lag in calibrating models to account for these changes. It is believed that the modeled results are valid for the planning-level analysis of project benefits presented.

It is important to note that the utility for using the STOPS modeling results for this Study was to enable comparisons between routes. Forecasted boardings shown in the next section include some very robust numbers, which do not generally reflect Pace experience for similar services. While demand estimates may overstate potential boardings for some proposed routes, the value of the analysis remains, that is, to assess comparative travel market performance.

## 5.2 Model Results

Table 5-1 lists 2040 boardings by STOPS model run. For the purpose of the presentation of results, origin terminals are assumed to be south locations, and destination terminals north, which generally reflect present travel patterns. Estimated boardings were aggregated for all local stops before entering the Tollway (i.e., origin terminal), and after leaving the Tollway (i.e., destination terminal). Off-line local stop boardings are presented separately when not a terminal (e.g., Elk Grove or Oak Brook), as well as boardings at assumed in-line stations. The boarding rank of the thirteen alternatives is also included. The specifications of model runs were designed to help inform decisions on choices for alternative alignments and terminals.

**Table 5-1. Summary of Model Run Results**

Run No.	Rank	Alternative	2040 Brdings	Origin Terminal		In-Line Station				ElkGrv Local	Rose-mont	OakBrk Local	Destination Terminal	
				Stop	Brdings	Cicero	103rd	Cermak	Oasis				Brdings	Terminal
1	1	Harvey-Elk Grove (via Rosemont)	4,393	Harvey	963	314	590	445	236		1,558		287	Elk Grove
1a	2	Harvey-Rosemont	3,506	Harvey	769	246	529	430	205				1,327	Rosemont
2	7	Harvey-Rosemont (via Busse)	1,957	Harvey	530	139	296	140		421			431	Rosemont
3	11	Harvey-Schaumburg (via 290)	930	Harvey	364	107	216	83					160	Schaumburg
4	8	Harvey-Schaumburg (via Busse)	1,241	Harvey	318	119	240	131		288			145	Schaumburg
5	3	Blue Island-Rosemont	2,768	Blue Islid	647		436	382	168				1,135	Rosemont
6	6	Blue Islid-Rosemnt (via OakBrk)	2,383	Blue Islid	470		313		119			623	858	Rosemont
6a	9	Oakbrook Center-Rosemont	1,110	Oak Brook	535				67				508	Rosemont
7	12	Blue Islid-Schaumbrg (via Busse)	832	Blue Islid	226		115	110		269			112	Schaumburg
8	5	Harvey-Midway	2,563	Harvey	348	78	37						2,100	Midway
9	4	Burr Ridge-Rosemont	2,609	BurrRidge	1,008			295	124				1,182	Rosemont
10	10	Harvey-Oak Brook	1,075	Harvey	431	127	239						278	Oak Brook
11	13	Blue Island-Oak Brook	575	Blue Islid	249		125						201	Oak Brook

## 5.3 Evaluation and Screening

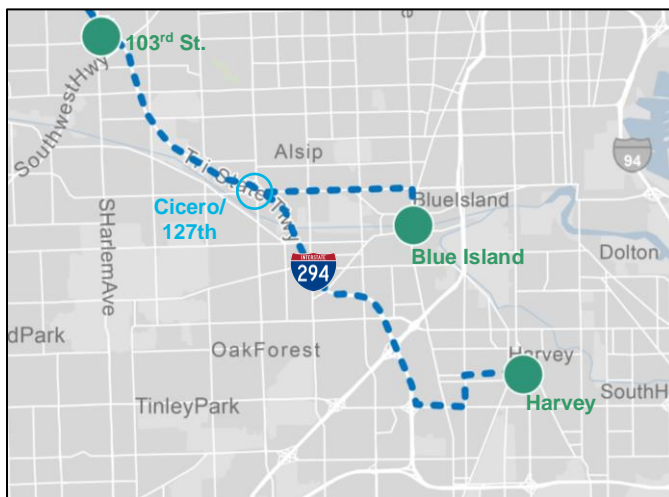
To narrow the set of alternatives, the model results were used to assess variations in market area passenger demand by alternative. As additional background to the travel markets associated with alternatives, Table 5-2 color codes origin and destination market areas. As can be seen, two of the origin markets are each represented by only one alternative, that is, Oak Brook and Burr Ridge. The remaining origin markets were Harvey or Blue Island.

**Table 5-2. Travel Markets by Alternative**

Run No.	Rank	Alternative	2040 Brdings	Origin Market	Destination Market(s)
1	1	Harvey-Elk Grove (via Rosemont)	4,393	Harvey	Rosemont/Elk Grove
1a	2	Harvey-Rosemont	3,506	Harvey	Rosemont
2	7	Harvey-Rosemont (via Busse)	1,957	Harvey	Elk Grove/Rosemont
3	11	Harvey-Schaumburg (via 290)	930	Harvey	Schaumburg
4	8	Harvey-Schaumburg (via Busse)	1,241	Harvey	Elk Grove/Schaumburg
5	3	Blue Island-Rosemont	2,768	Blue Island	Rosemont
6	6	Blue Island-Rosemnt (via Oak Brook)	2,383	Blue Island	Oak Brook/Rosemont
6a	9	Oakbrook Center-Rosemont	1,110	Oak Brook	Rosemont
7	12	Blue Island-Schaumbrg (via Busse)	832	Blue Island	Elk Grove/Schaumburg
8	5	Harvey-Midway	2,563	Harvey	Midway
9	4	Burr Ridge-Rosemont	2,609	Burr Ridge	Rosemont
10	10	Harvey-Oak Brook	1,075	Harvey	Oak Brook
11	13	Blue Island-Oak Brook	575	Blue Island	Oak Brook

The Harvey Transportation Center and the Blue Island terminal are less than four miles apart and have overlapping market sheds (see Figure 5-1). The Blue Island market area is accessible to the 103<sup>rd</sup> Street and Cicero in-line stations. While it was decided to not advance the Cicero/127<sup>th</sup> Street location as an in-line station, it was determined to be physically feasible and could be developed in the future. Moreover, the way that the I-294 ramps are configured between Cicero Avenue and 127<sup>th</sup> Street, buses could pull-off, stop, and return to I-294 with relatively limited travel time impact. The assessment of potential demand discussed below considers these points on the relative merit of a Blue Island versus Harvey origin terminal.

**Figure 5-1. Harvey versus Blue Island Market Areas**



### 1. Harvey-Elk Grove (via Rosemont)

This was the best performing alternative: the 4,400 boardings were 25 percent higher than the next highest modeled service (i.e., 1a Harvey-Rosemont at 3,500). It was noted that service between Rosemont and Elk Grove would be redundant with Pace Route 223, Elk Grove–Rosemont CTA Station. Also, I-294 corridor service to Elk Grove would be more attractive with a route that approached Elk Grove from the south end of O’Hare Airport. Since the alignments proposed to connect Elk Grove use the programmed I-490, which is not slated for opening until 2025, it was decided to retain Alternative 1 as a possible phasing step in serving Elk Grove.

## 1a. Harvey-Rosemont

Alternative 1a was an outgrowth of the review of Alternative 1 results and involved truncating the north end at the Rosemont Transit Center. At 3,500 boardings per day in 2040, the alternative ranked second among the thirteen alternatives. Alternative 1a is recommended to advance.

## 2. Harvey-Rosemont (via Busse)

This service was similar to Alternative 1, except the pattern at the north end would serve Elk Grove (Busse) first, then terminate at the Rosemont Transit Center. Total estimated ridership was half that of Alternative 1, mostly the result of significantly fewer boardings at Rosemont. Boardings at Elk Grove were more than for Alternative 1, which was expected since service would be more direct for Elk Grove-destined travelers originating from points south. Direct service to Elk Grove appears worthwhile, but not paired with a Rosemont terminal; Alternative 2 is not recommended to advance.

## 3. Harvey-Schaumburg (via I-290)

Alternative 3 starts in Harvey but diverts from I-294 via the programmed I-490 freeway, then uses IL 390 and I-290 to serve Schaumburg. While the job-rich travel market in Elk Grove would be skipped, this alignment would provide the quickest route from areas south to Schaumburg. The modeled boardings of 930 ranked eleventh among thirteen routes. Combining the Schaumburg and Elk Grove markets into a single route (Alternative 4) would boost demand without a significant increase in travel time. This alternative is not recommended to advance.

## 4. Harvey-Schaumburg (via Busse)

As described for Alternative 3, this option still serves Schaumburg, but would first operate through Elk Grove, generally via Busse Road. Attracting over 1,200 weekday boardings, it would have 300 more boardings than Alternative 3. While ranking in the lower tier of routes modeled, these markets are still important to serve, and this alternative is recommended to advance.

## 5. Blue Island-Rosemont

This alternative would provide express service between Blue Island and Rosemont. While the service attracted 2,800 boardings, third highest among the thirteen routes modeled, it was lower than the 3,500 boardings for Alternative 1a Harvey-Rosemont. This result shows the relative strength of Harvey over Blue Island as a southern terminal, which was found in other alternatives as well. This alternative is not recommended to advance.

## 6. Blue Island-Rosemont (via Oakbrook Center)

This route was similar to Alternative 5 Blue Island-Rosemont, but with a deviation from I-294 to serve Oakbrook Center. This alternative was intended to test the impact of serving Oak Brook directly as compared to the performance of Alternative 5 (Blue Island-Rosemont) without deviation. Alternative 6 attracted nearly 400 fewer boardings and ranked sixth out of thirteen. The deviation would add approximately three miles and 12 minutes of travel time to the route, and tempered Rosemont boardings. Given the lower boardings by deviating service, this concept is not recommended to advance.

The attraction of this route is partly for the Oak Brook-Rosemont connection. It was suggested that Harvey-Rosemont be broken into two individual routes that would use Oak Brook as a terminal, that is, Harvey-Oak Brook (Alternative 10) and Oak Brook-Rosemont (Alternative 6a).

## 6a. Oakbrook Center-Rosemont

Alternative 6a was estimated to attract 1,110 weekday boardings, ranking ninth among the thirteen routes. Although this performance was comparatively low, connecting two major transit

centers may be an important strategic consideration for Pace. The Oakbrook Center location would also be served by two future Pulse Lines, Cermak Road and Roosevelt Road, further emphasizing the importance of this location. While the in-line station at the Cermak Toll Plaza site is recommended to advance, the effectiveness of this improvement to connect with Oak Brook destinations further west is uncertain. Also, whether the Cermak Pulse Line will deviate to the in-line station is unclear and would be counter Pace Pulse guidelines. For these reasons, it is recommended that the Oakbrook Center-Rosemont route be advanced for additional study.

## 7. Blue Island-Schaumburg (via Busse)

Alternative 7 was similar to Alternative 4 (serving the Elk Grove and Schaumburg markets from Harvey), but instead originating in Blue Island. Attracting an estimated 832 weekday boardings, the service ranked twelfth among thirteen routes. By comparison, Alternative 4 generated 1,243 boardings. This alternative is not recommended to advance.

## 8. Harvey-Midway

This alternative would leave I-294 and follow Harlem Avenue northward to serve the Bedford Park area, then terminate at the Midway Transit Center. The service attracted 2,600 boardings, ranking fifth of the thirteen lines modeled. A review of STOPS station-to-station summaries revealed that the Bedford Park area accounted for a significant share of Alternative 8's boardings (Table 5-3). Specifically, the portion of the route after leaving I-294 (i.e., Harlem and 95<sup>th</sup> Street) to the Midway Transit Center accounted for 75 percent of the boardings. However, there is reason to believe that the south suburban areas served by the alternative may have more potential than is reflected by the model results. For example, a major Amazon facility is being developed at 159th Street at I-294. Also, it is believed that the modeling may have understated future demand, since there is not a strong current pattern of travel from the affected south suburbs and the job-rich Bedford Park area. (As noted in Section 5.1, one of the drivers of the STOPS model is existing worker flows from the CTPP.) This alternative is recommended to advance for further study.

**Table 5-3. Harvey-Midway Station-to-Station Boardings by Segment**

Segment	Harvey Area	294 Stops	Bedford Park Area	Total Attractions
Harvey Area	110	49	214	373
294 Stops	44	31	153	228
Bedford Park Area	70	6	1,870	1,946
Total Productions	224	86	2,237	2,547

## 9. Burr Ridge-Rosemont

The south terminal of Alternative 9 is at the Burr Ridge Park-n-Ride, which currently supports the I-55 Bus on Shoulders Express Bus services. The alternative generated an estimated 2,600 boardings, ranking fourth highest and suggesting this service advance for further study. One issue is that parking at the Burr Ridge Park-n-Ride facility was at capacity prior to the COVID-19 pandemic. Further consideration of the alternative should have an assurance that parking can be expanded, preferably with local responsibility for operation and maintenance.

## 10. Harvey-Oak Brook

This was discussed under Alternative 6 as a complement to Alternative 6a, Oak Brook-Rosemont. Alternative 10 had an estimated 1,075 weekday boardings from the STOPS model and ranked tenth of thirteen. While overall ridership performance is comparatively low, Pace

believes this alternative should advance for further study to build the Oak Brook terminal within the future Pace bus network.

### 11. Blue Island-Oak Brook

The Blue Island-Oak Brook service ranked last among the thirteen alternatives, attracting 575 weekday boardings. By comparison, Alternative 10 Harvey-Oak Brook had twice the number of estimated boardings. Therefore, Alternative 11 is recommended to be dropped from further study.

### Summary

A summary of service recommendations is provided on Table 5-4.

**Table 5-4. Summary of Preliminary Recommendations**

Advance for Further Study		Do not Advance for Further Study	
1	Harvey-Elk Grove (via Rosemont)	2	Harvey-Rosemont (via Busse)
1a	Harvey-Rosemont	3	Harvey-Schaumburg (via I-290)
4	Harvey-Schaumburg (via Busse)	5	Blue Island-Rosemont
6a	Oakbrook Center-Rosemont	6	Blue Island-Rosemont (via Oak Brook)
8	Harvey-Midway	7	Blue Island-Schaumburg (via Busse)
9	Burr Ridge-Rosemont	11	Blue Island-Oak Brook
10	Harvey-Oak Brook		

## 6. Operations & Maintenance Costs

Operations and maintenance (O&M) costs were estimated for the alternative services evaluated. The O&M annual cost estimate is based on total annual vehicle hours and a cost per vehicle hour provided by Pace.

Total annual vehicle hours were calculated by first estimating revenue hours and then converting to total vehicle hours.<sup>3</sup> Revenue hours for each route were based on the end-to-end travel time, the proposed service frequency, the span of service, and a 15% layover assumption. The total annual revenue hours for the route was then multiplied by 1.13<sup>4</sup> to estimate annual vehicle hours on the route.

The cost per vehicle hour was provided by Pace for 2019 and inflated to 2020 using the Consumer Price Index (i.e., +1.2%). For 2020 this cost is \$80.66 per vehicle hour.

Table 6-1 provides revenue hours, vehicle hours, and cost for the thirteen routes evaluated. The routes for further study are highlighted in blue. Estimated annual O&M costs ranged from \$1.16 million for Alternative 6a (Oakbrook Center–Rosemont) to \$2.65 million for Harvey-Elk Grove (via Rosemont). These costs should be considered in light of varying alignment length and modeled boarding counts across alignments.

**Table 6-1. Estimated Vehicle Hours and Annual Operating Cost by Route**

Alt.	Description	Annual Rev Hour	Annual Vehicle Hour	Peak Buses	Total Fleet	Annual O&M Cost (FY20\$, in M)
1	Harvey-Elk Grove (via Rosemont)	29,070	32,849	8	10	\$2.65
1a	Harvey-Rosemont	19,635	22,188	6	7	\$1.79
2	Harvey-Rosemont (via Busse)	25,755	29,103	7	8	\$2.35
3	Harvey-Schaumburg (via I-290)	28,433	32,129	8	10	\$2.59
4	Harvey-Schaumburg (via Busse)	27,795	31,408	8	10	\$2.53
5	Blue Island-Rosemont	20,910	23,628	6	7	\$1.91
6	Blue Island-Rosemont (via Oak Brook)	24,225	27,374	6	7	\$2.21
6a	Oakbrook Center-Rosemont	12,750	14,408	4	5	\$1.16
7	Blue Island-Schaumburg (via Busse)	26,520	29,968	8	10	\$2.42
8	Harvey-Midway	19,253	21,756	6	7	\$1.75
9	Burr Ridge-Rosemont	16,193	18,298	4	5	\$1.48
10	Harvey-Oak Brook	16,320	18,442	4	5	\$1.49
11	Blue Island-Oak Brook	16,065	18,153	4	5	\$1.46

<sup>3</sup> A revenue hour is the hour the bus is in service and includes recovery/layover time that occurs when the route finishes its trip before turning around to make the return trip. A vehicle hour includes revenue hours, but also adds the deadhead time to/from the garage at the beginning and end of each driver shift.

<sup>4</sup> In 2019 Pace reported 1,807,231 vehicle hours and 1,595,767 revenue hours, resulting in a ratio of 1.13 vehicle hours to revenue hours.

