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

Summary Report

Regional Transportation Authority and Pace Suburban Bus

Regional Transportation Authority

pace

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Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ACS	American Community Survey
ADA	Americans with Disabilities Act
ATM	the Active Traffic Management system
BUILD	Better Utilizing Investments to Leverage Development
BRT	Bus Rapid Transit
CE	Categorical Exclusion (NEPA class of action)
CIG	Capital Investment Grants (FTA)
CTPP	Census Transportation Planning Products
CTA	Chicago Transit Authority
C-D	Collector-Distributor ramps
CCTV	Closed Circuit Television
CMAP	Chicago Metropolitan Agency for Planning
CMAQ	Congestion Mitigation and Air Quality program
CCDOTH	Cook County Department of Transportation and Highways
FTA	Federal Transit Administration
GTFS	General Transit Feed Specification
HOV	high occupancy vehicle system
HH	household
IDOT	Illinois Department of Transportation
ICE	Innovation, Coordination, and Enhancement program (RTA)
LCM	(Flex) Lane Control Signals
MED	Metra Electric District
MVTA	Minnesota Valley Transit Authority
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
ORD	Chicago O'Hare International Airport
O&M	Operations & Maintenance costs
O-D	origin-destination
RAISE	Rebuilding American Infrastructure with Sustainability and Equity
RRFB	Rectangular Rapid Flashing Beacon
RTA	Regional Transportation Authority
RID	Metra Rock Island District
RTD	Denver Regional Transit District
RSP	regionally significant project
ROW	right-of-way
SOP	Standard Operating Procedures
SCC	Standard Cost Categories (FTA)
STOPS	Simplified Trips-on-Project Software
STP	Surface Transportation Program
TIF	Tax Increment District
TOC	Tollway Operations Centers
TOD	transit-oriented development
TIFIA	Transportation Infrastructure Finance and Innovation Act
TAZ	transportation analysis zone
TIGER	Transportation Investment Generating Economic Recovery grant program
TRB	Transportation Research Board
DOT	US Department of Transportation

1. Study Background and Purpose

The Regional Transportation Authority (RTA) / Pace Bus I-294 Tri-State Market & Facilities Feasibility Study (Study) identified and evaluated 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 95th Street (Central Tri-State Project). 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. Flex Lanes are the left inside shoulder of the roadway; Pace buses are directed to the Lane by the Illinois Tollway's traffic operations center. 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.

From this Study, the agencies identified and evaluated several options that will allow Pace buses to benefit from the Central Tri-State improvements. Pace bus use of the Flex Lanes when traffic is congested will help make service in this corridor a competitive and affordable alternative to driving.

Recommendations from this Study include:

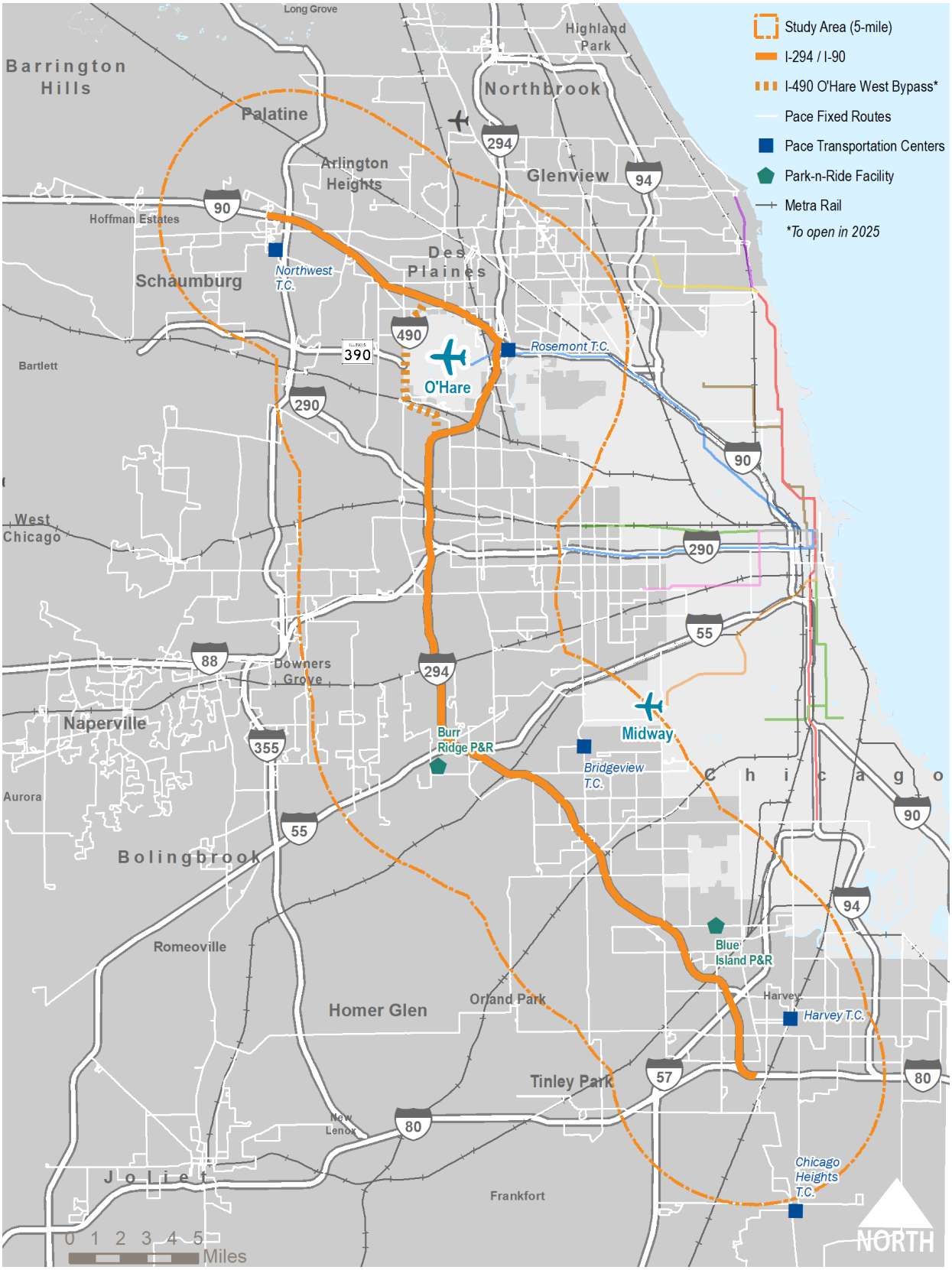
- Pace Express bus service concepts that primarily operate along the I-294 Tri-State Tollway.
- Stations, roadway modifications, and other infrastructure needed to support proposed bus service and provide improvements in passenger comfort, bus speeds, travel times, and access to jobs and other transit connections.
- A plan for implementing proposed bus services and associated support infrastructure.

These recommendations were derived from a robust market analysis of existing and predicted travel patterns in the Study area, computer modeling of service concepts, and engineering assessments of potential site locations. Pace and RTA also coordinated with the Illinois Tollway throughout the Study's development.

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 Assessment Feasibility Study Area



1.2 Task Overview

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

Task 1: Existing Conditions and Travel Market

- 1.1 Transit Service (link to full report: ____)
- 1.2 Traffic Conditions (link to full report: ____)
- 1.3 Market Analysis (link to full report: ____)

Task 2: Conceptual Service Design and Infrastructure

- 2.1 Service Plans (link to full report: ____)
- 2.2 Generic Infrastructure Concepts (link to full report: ____)
- 2.3 Station Concepts & Capital Costs (link to full report: ____)

Task 3: Implementation Plan (link to full report: ____)

Task 4: Public Outreach and Marketing

Task 5: Summary Report

The Task 5 Summary Report provides a recap of the research and findings contained in the prior task reports. These reports led to a series of recommendations that included:

- Thirteen conceptual express routes that would primarily use the I-294 Tri-State Tollway were identified and evaluated; a screening reduced these to seven to advance for further consideration.
- The identification of 32 possible station locations, which were screened to five, based on physical feasibility. Three locations were recommended for further consideration. Proposed layouts of the three were developed, which included bus exit/entry ramps, platforms, and passenger/vehicle circulation and access. Capital costs to construct the infrastructure were estimated.
- A plan for implementing proposed bus services and associated support infrastructure was outlined. A key initial step will be to work with partner entities.

This Summary Report also documents stakeholder and public engagement, summarizing input from an on-line survey.

2. Existing Conditions

Documentation of existing and future transportation conditions in the Study corridor was provided in two technical memoranda, Transit Service and Traffic Conditions.

2.1 Transit Service

The Task 1.1 *Transit Service Existing Conditions Technical Memorandum* documented existing transit service in the Study Area. Sections included:

1. Review of relevant plans, studies, and projects,
2. Existing transit services in the Study Area, and
3. Evaluation of selected Pace routes relevant to the Study.

2.1.1 Relevant Background Documents

- Pace Vision 2020: The Blueprint for the Future (2001)
- Driving Innovation: The Pace Strategic Vision Plan (2021)
- Pace Transit Supportive Guidelines (2013)
- Pace Pulse Rapid Transit Program (current)
- Pace Illinois Route 390 Tollway Corridor Service Study (2017)
- Pace & Illinois Tollway TIGER Grant Proposal: I-294 Express Bus Service (2009)
- Cook County Department of Transportation and Highways (CCDOTH) South Cook County Mobility Study (2019)
- Illinois Tollway Jane Addams Memorial Tollway (I-90) SmartRoad (current)
- CMAP ON TO 2050 Regional Comprehensive Plan (2018)

2.1.2 Existing Transit Services

The Study Area is served with a number of transit services operated by Pace, CTA, and Metra. Summary descriptions of service operated by these providers and high-level statistics related to existing service follow. Documentation of ridership is based on statistics from 2019, which reflected pre-pandemic service levels. Service on some of the routes documented was suspended during 2020 and 2021 due to the pandemic.

Table 2-1 shows information on Pace fixed-routes within a half mile of the I-294/I-90 alignment. As can be seen, Pace operates 53 regularly-scheduled routes, reflecting six different service types.

Table 2-1. Study Area Pace Routes by Service Category

Service Category	No. of Routes	Weekday Rides*
Primary	15	24,753
Secondary	7	4,011
Connector	7	3,078
Express	20	6,866
Commute Shuttle	3	52
On Demand	1	31
Total	53	38,791

*SOURCE: Pace, *Average Weekday, 4th Quarter 2019 (pre-pandemic)*

Of special interest to the Study are Pace express routes. Table 2-2 shows the number of express routes that operated pre-pandemic (service on many of the routes were suspended due to the pandemic). The number of routes and ridership were highest for those operating on I-55 and I-90.

Table 2-2. Pace Express Bus Routes by Interstate Highway

Interstate	No. of Routes	Weekday Rides*
I-294	4	596
I-294 & I-90	1	85
I-90	7	3,226
I-290	1	155
I-55	6	2,707
I-80	1	97
Total	20	6,866

*SOURCE: Pace, *Average Weekday, 4th Quarter 2019 (pre-pandemic)*

Within the Study Area, Metra commuter rail lines intersect with I-294 and I-90 at ten locations. For eight of the ten locations, the freeway crosses above the rail line.

The last four stations of the Chicago Transit Authority (CTA) Blue Line O'Hare Branch are the only rapid transit stations located in the Study Area, including O'Hare, Rosemont, Cumberland, and Harlem. Other CTA rail stations located just outside the five-mile Study Area are the Forest Park Station on the Blue Line Forest Park Branch and the Harlem/Lake Station on the Green Line Lake Branch. The only CTA bus route in the Study Area is Route 169, 69th-UPS Express.

2.1.3 Evaluation of Selected Pace Routes

Eight routes that operate on or near I-294 were identified for more in-depth, targeted review. This analysis was intended to inform subsequent Study work.

General findings related to each route are summarized as follows:

Route 223 Elk Grove-Rosemont CTA Station: Route 223 is an important link between the CTA Rosemont Station and jobs on the west side of O'Hare and Elk Grove Village. Because these jobs tend to be shift work, this 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 on Route 330 are traveling shorter distances along the corridor and that not all are destined for major activity centers at Rosemont or O'Hare.

Route 395 95th/Dan Ryan CTA-UPS Hodgkins Limited and Route 890 Chicago Heights-UPS Hodgkins Limited: Due to shift work at the UPS Hodgkins facility, Routes 395 and 890 are likely not compatible with other future service on the Tri-State Tollway.

Route 757 Oak Park-Schaumburg Limited: Route 757 connects the CTA Forest Park and CTA Harlem/Lake Stations with Schaumburg. The most productive part of this route is along Busse Road in Elk Grove and at Continental Towers (Golf Road / New Wilke Road in Rolling Meadows).

Route 877 Harvey-Downers Grove Limited and Route 888 Homewood-Naperville Limited: Routes 877 and 888 are oriented to office and service sector jobs along the I-88 corridor. On-time performance data reveal an issue when exiting I-294, but routes make up lost time as they operate along 22nd Street and Butterfield Road.

Route 895 Rosemont-Schaumburg Express: Only a couple of locations on Route 895 in Schaumburg have high activity: the Northwest Transportation Center and the end of the line along Algonquin Road.

2.2 Existing Traffic Conditions

The *Existing Traffic Conditions Technical Memorandum*, Task 1.2, provided documentation on roadway travel conditions in the Study Area. This information was used in the planning of express bus service, providing insights on traffic volumes and congestion in the corridor that will impact express bus service performance.

2.2.1 Existing Conditions

Existing Tollway traffic conditions in the Study Area were drawn from the Illinois Tollway's annual Traffic Data Reports for calendar years 2019, 2018, and 2017. The Technical Memorandum noted that the impacts of the COVID-19 pandemic on travel demand and patterns were unknown, pre-pandemic traffic conditions from 2019 were referenced.

2.2.2 Programmed Roadway Improvements

Programmed Illinois Tollway improvements relevant to the Study were documented, including:

Central Tri-State Tollway (I-294) Project: The Central Tri-State Tollway project is reconstructing and widening I-294 from Balmoral Avenue to 95th Street to provide congestion relief, reconstruct old infrastructure, and address regional needs. The project is scheduled from 2018 through 2026. Major elements include:

- Mile Long Bridge – The Mile Long Bridge spans two major railroads, three water resources and local roads, and a major distribution center for UPS and BNSF Railway.
- Burlington Northern Santa Fe (BNSF) Railway Bridge Project – The Tollway is reconstructing the BNSF Railway Bridge to accommodate the widening of I-294.
- I-290/I-88 Interchange Project at I-294 – This project includes reconfiguring the I-290/I-88 Interchange at I-294 to address a bottleneck in this important connection point.
- Flex Lanes – Flex Lanes have been integrated into the design of I-294. A Flex Lane is located on the left inside shoulder of the roadway and can be used to support safety as well as accommodate future needs and transit options.

I-294/I-57 Interchange Project - Phase 2: The project creates an interstate-to-interstate connection and is a partnership between the Illinois Tollway and the Illinois Department of Transportation (IDOT). Phase 2 began in 2019 and is scheduled to be complete by the end of 2022.

I-490 Tollway: I-490, also known as the Elgin O'Hare Western Access Project, is a new all-electronic Tollway that will carry north-south traffic around the western border of O'Hare Airport and provide access to the Airport. I-490 is scheduled for completion in 2025.

2.2.3 Future Conditions

To provide insight into how Pace could take advantage of the Flex Lanes, as well as to estimate express bus running times, the Illinois Tollway suggested that, for planning purposes, any section of I-294 with a planned Flex Lane and gantries (i.e., overhead signage), the operation of Pace express bus service would be similar to current I-90 service.

The I-90 Smart Road operations rules of operation associated with the I-90 Flex Lanes are listed as follows:

1. There are three predefined sections for Flex Lane operations, and sections may be opened or closed independently of the others.
2. Sections can be opened to Pace when traffic congestion exceeds a threshold for congestion and when the left shoulder is clear of incidents, debris, traffic stops, and maintenance activities as identified through CCTV monitoring at the Tollway Operations Center (TOC).
3. The display on the Flex Lane Control Signals (LCS) are set by a system administrator and can only be overridden by Technicians with an event response plan.
4. When the Flex Lane is open to buses it will display “PACE BUS ONLY.”
5. When the Flex Lane is closed to traffic, it will display a Red X. The Flex Lane may be opened to general purpose traffic during severe conditions through Technician and supervisory response plan activation. Severe conditions are when an incident queue extends to at least one mile.

Internal Pace operating guidelines for use of the I-90 Flex Lanes include a maximum speed of 50 mph when general purpose lane traffic speeds are at 35 mph. Buses are not to exceed the speed of general traffic by more than 15 mph. The general purpose lane speed limit is 70 mph between Des Plaines and Elgin and 60 mph between Rosemont and Des Plaines. (I-294 posted speeds are 55 mph.)

3. Market Analysis

Task 1.3 Market Analysis documented current and future transit service demand In the Study Area. This information provided the foundation to formulate service and infrastructure recommendations in later tasks by understanding transit and non-transit travel flows in the I-294/I-90 corridor. The Task 1.3 *Market Analysis Technical Memorandum* was organized to include the following sections:

1. Analytical Framework, including data sources and geography selection and pairings
2. Socioeconomic Trends
3. Travel Flows
4. Summary of Key Findings

3.1 Analytical Framework

Travel Flow Data Sources: The primary origin-destination data source in the travel flow analysis was the Census Transportation Planning Products (CTPP). These data describe existing commuting patterns and are based on American Community Survey (ACS) responses. As it is produced using survey data, the CTPP reflect accurate home and work locations, but is affected by sampling errors at smaller levels of geography and reporting errors due to incomplete survey responses. The CTPP data is published roughly every five years, with the dataset used for the analysis covering the period 2012-2016. CTPP provides a number of other useful commuter attributes in addition to commute origin and destination, including travel mode and work-from-home status.

A limitation of CTPP is that it only reports commute origin-destination patterns. To gauge the total trip market including non-work trips, data were gathered from Replica, a company which models the total travel market using mobile location data.

All data inputs were pre-2020 and while the impacts associated with COVID-19 were acknowledged, the analysis assumed that post-pandemic origin-destination patterns will ultimately remain largely similar to historical distributions.

Geographies: The market analysis generally proceeded from a higher-level description of regional trends to more detailed analysis pertaining to particular locations along the Study corridor. To accommodate this progressively narrowing analytical focus, several different geographic types were used: zone groups, zones, employment clusters, Study Area polygons, and connecting transit corridors. While the zone groups, zones, and employment clusters were used in the regional analysis to report macro trends, the custom geographies (polygons and corridors) were developed to report on the details of the Study Area.

- **Polygons**: To segment the population living within a reasonable distance of the corridor who might potentially use an I-294 express bus service, the five-mile Study Area was divided into 15 polygons (see Figure 3-1). A variant of this geography combines polygons into three equal groups, i.e., north, central, south.
- **Corridors**: Transit connection corridors were defined to identify the commuter homes and workplaces that could potentially be connected by an I-294 express bus service, serving as either the link between the worker's home and the I-294 service, or between the I-294 service and the workplace. A total of 49 corridors were defined, comprising existing Pace local and express routes, future Pace Pulse Lines, and Metra and CTA rail connections. Figure 3-2 illustrates the corridors in map form.

Figure 3-1. I-294 Polygons

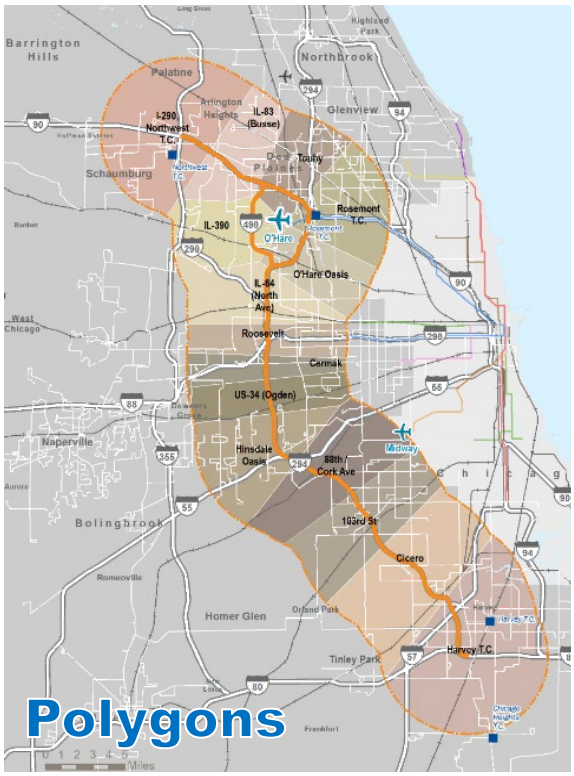


Figure 3-2. I-294 Corridors

In the market analysis, all possible permutations of polygon and corridor combinations were assessed in order to identify the most promising markets. Generally, origin-destination pairs with a polygon origin were categorized as a park-n-ride market and those with a corridor origin were categorized as a walk-access transit market.

3.2 Socioeconomic Trends

According to data from the Chicago Metropolitan Agency for Planning (CMAP), there were about 1.95 million people living in households within the 5-mile radius of the Study corridor in 2015, and about 1.11 million jobs. This represents roughly a quarter of the total population and jobs in the seven-county CMAP planning area in about 13 percent (528 square miles) of its area. CMAP forecasts indicate that by 2050, household population for this area will grow by 19 percent to roughly 2.31 million, and employment will increase by 17 percent to 1.30 million jobs.

Breakdowns of corridor growth by polygon group are presented in Table 3-1. Generally, population density is fairly even across the north, central, and southern ends of the Study Area, with greater growth expected in the south by 2050. Employment is likewise expected to increase proportionally more rapidly in the south, but it currently lags, at less than half of the density seen in the north (1.8 versus 4.7 jobs per acre). This increased job density to the north (driven largely by the O'Hare employment cluster and Schaumburg area) has a major impact on travel flows in the Study Area, as described in Section 3.3.

Table 3-1. Household Population and Jobs by Polygon Group (2015, 2050)

Polygon Group	HH Pop. (2015)	HH Pop. (2050)	HH Pop / acre (2015)	HH Pop / acre (2050)	Change 2015-2050
North	755,249	869,266	6.4	7.4	15%
Central	595,536	698,645	5.4	6.3	17%
South	596,895	741,351	5.7	7.0	24%

Polygon Group	Jobs (2015)	Jobs (2050)	Jobs / acre (2015)	Jobs / acre (2050)	Change 2015-2050
North	558,445	636,731	4.7	5.4	14%
Central	356,801	412,402	3.2	3.7	16%
South	193,185	247,385	1.8	2.4	28%

Source: CMAP On To 2050. HH Population: household population (i.e., group quarter population not included).

O'Hare Airport (ORD) Analysis

Given the significant concentration of jobs at O'Hare Airport (ORD), analysis was also conducted using the home location of ORD employees from a 2018 Chicago Department of Aviation survey. Approximately one-third of the 40,000 workers who participated in the survey live within the five-mile Study Area. Among these, about 66 percent live in the northern segment, 20% in the central segment, and 14% live in the south. About 60 percent of employees live within one mile of one of the identified transit connection corridors (especially along the CTA Blue Line and other locations with easy CTA rail connections to ORD). The Pace routes in the southern segment that could feed into an express I-294 service connecting workers to ORD include future Pulse 95th Street Line, future Pulse Cicero Line, Routes 359, 379, 384, and 385.

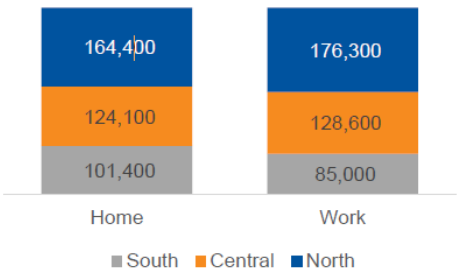
3.3 Travel Flows

The *Market Analysis Technical Memorandum* analyzed and mapped CTPP corridor work trip flows in multiple levels of detail, including regional travel patterns, the estimated park-n-ride market, and estimated walk-access transit market. For brevity, only high-level findings about the Study Area are presented in this Summary Report, but further details are available in the *Market Analysis Technical Memorandum* and its appendices.

Study Area

About 390,000 commuters both live and work within the 5-mile Study corridor, with a higher proportion in the northern polygon group. Given that workers often choose to live near where they work, if possible, commutes that start and end within the same location make up 79% of all commutes ("intra" trips in Figure 3-3). Northbound trips between adjacent polygon groups are the next most common, followed by southbound and finally end-to-end trips.

Figure 3-3. Commuters by Home & Work Polygon Group; Related Travel Flows



Source: CTPP (2012-2016).

	Commuters	Share	
North to North	142,700	36.6%	Intra
Central to Central	91,200	23.4%	
South to South	72,900	18.7%	
Central to North	23,800	6.1%	Northbound
South to Central	18,700	4.8%	
North to Central	18,600	4.8%	Southbound
Central to South	9,000	2.3%	
South to North	9,700	2.5%	End-to-end
North to South	3,100	0.8%	

After disaggregating the polygon group totals to the individual 15 polygons, from I-290 / Northwest Transportation Center in the north to Harvey Transportation Center in the south, these trends remain, with 46 percent of commutes occurring within a single polygon, 31 percent traveling north to work, and 23 percent traveling south to work. The approximate inflection point of northbound versus southbound travel is near the O'Hare Oasis, indicative of the primacy of O'Hare area employment in commuter travel patterns.

Park-n-Ride Market

The park-n-ride assessment evaluated the CTPP data by polygon-corridor pair, with the 5-mile polygon representing the drive-access shed of a park-n-ride origin point and the corridor representing transit connections to reach destinations not immediately adjacent to the Tri-State.

In the analysis including all future and existing transit connections (including potential CTA and Metra transfers), the locations that emerge as the highest potential origin locations include I-290 / Northwest Transportation Center, 127th / Cicero, Harvey Transportation Center, Hinsdale Oasis, and Rosemont Transit Center. The highest potential destination locations include Harvey Transportation Center, Rosemont Transit Center, IL-83 (Busse), and 127th / Cicero, followed by 103rd Street and 88th Avenue (Cork).

To identify more immediate opportunities and more targeted ridership markets, the non-direct CTA and Metra connections as well as the Pace Pulse lines in the medium- or long-term horizon were excluded, as were commute origin-destination pairs under 10 miles in air-line distance (deemed less likely to benefit from express Tri-State service due to limited access and egress opportunities). The analysis showed that among this set of prioritized corridors the most promising destination locations were:

- Rosemont Transit Center
- IL-64 (North Avenue)
- Cermak
- 103rd Street
- 88th Avenue (Cork), or other locations with transfers to I-55 Pace express services to downtown

The corresponding origin markets for each of these destinations varied somewhat, but often included **I-290 / Northwest Transportation Center, Rosemont Transit Center, Roosevelt, US-34 (Ogden), Hinsdale Oasis, 103rd St., and 127th / Cicero.** The origin-destination pairs by commuter origin density are provided in Table 3-2.

Table 3-2. Park-n-Ride Commuter Density by O-D Pair

		Work Corridor Access Points				
		Rosemont T.C.	IL-64 (North Ave)	Cermak	88th/Cork	103rd St Redev.
Home Polygon	01. I-290, Northwest T.C.	192	47	58	123	43
	02. IL-83 (Busse)	150	30	30	143	19
	03. Touhy	154	21	29	146	21
	04. Rosemont T.C.		54	31	330	39
	05. IL-390	53	10	16	40	16
	06. O'Hare Oasis	167	52	16	152	41
	07. IL-64 (North Ave)	136		10	132	31
	08. Roosevelt	202	33	13	184	40
	09. Cermak	104	26		84	32
	10. US-34 (Ogden)	357	34	17	323	39
	11. Hinsdale Oasis	210	42	31	190	32
	12. 88th / Cork Ave	157	40	32		21
	13. 103rd St.	253	62	61	205	
	14. Cicero	279	48	35	284	30
	15. Harvey T.C.	166	27	21	168	32
	Total	199	38	31	178	32

Source: CTPP (2012-2016). Commuters per home polygon square mile.

Walk-Access Transit Market

In this assessment, the CTPP data were analyzed to determine the number of commuters traveling between their home within one mile of a connecting transit corridor (i.e., "home corridor") and their workplace, likewise within one mile of a connecting transit corridor ("work corridor"). Each of the home corridors and work corridors were associated with one or more generalized access point(s) along the Tri-State. To minimize the trips unlikely to be taken via Tri-State service, commuters traveling less than 10 miles were excluded, and a separate analysis

of the immediate opportunities in the prioritized corridors (as defined in the park-n-ride assessment) was completed.

Unsurprisingly, the potential for a rapid trip downtown differentiates the highest performing locations—work access points at **Rosemont Transit Center** (connecting to the CTA Blue Line downtown) and transfers to I-55 Pace services at **88th Avenue (Cork),** as well as future Pulse Lines **Cermak** and **Roosevelt**. The next tier of high-performing work access points is **Northwest Transportation Center, IL-64 (North Avenue)**, and **103rd Street**.

The highest performing origin access points were generally consistent: **Rosemont Transit Center** and the four southernmost locations: **88th Avenue (Cork)**, **103rd Street**, **127th / Cicero**, and **Harvey Transportation Center.**

An additional screening was performed to better filter out commutes that may be better served by an existing transit connection (CTA, Pace, or Metra). This involved running transit travel time analyses in GIS using early 2020 General Transit Feed Specification (GTFS) schedule data together with a sketch GTFS schedule for the proposed Tri-State express bus service. Network analysis identified the O-D pairs that would experience travel time savings with the Tri-State service implemented, and this filtered market is summarized in the matrix below. Work connections at Rosemont (and Northwest Transportation Center) in the north; IL-64 (North Ave) and Cermak in the center; and Harvey Transportation Center in the south remain the high-performers in this analysis. Note that O'Hare Oasis and US-34 (Ogden) are excluded due to the absence of existing transit connections.

Table 3-3. Commuters with Transit Travel Time Savings (prioritized corridors)

Home Access Point	Work Access Point: Northwest T.C.	IL-83 (Busse)	Touhy	Rosemont T.C.	IL-390	O'Hare Oasis	IL-64 (N. Ave)	Roosevelt	Cermak	US-34 (Ogden)	88th / Cork	103rd St.	Cicero	Harvey T.C.
Northwest T.C.	320	281	32	631	150	0	620	421	508	0	71	267	19	221
IL-83 (Busse)	914	698	393	1,922	289	0	1,371	1,079	1,324	0	588	672	194	560
Touhy	702	602	358	1,342	112	0	1,174	844	1,207	0	341	724	232	804
Rosemont T.C.	780	707	335	2,365	261	0	1,574	1,593	2,070	0	434	723	185	1,478
IL-390	570	384	338	1,311	75	0	620	599	742	0	533	504	169	396
O'Hare Oasis	1,180	1,114	779	1,749	197	0	1,319	497	785	0	286	671	192	751
IL-64 (North Ave)	1,071	850	472	1,379	28	0	779	286	344	0	182	991	136	201
Roosevelt	914	813	497	1,528	62	0	680	176	321	0	271	761	169	304
Cermak	1,054	824	772	2,049	113	0	846	299	419	0	589	896	137	283
US-34 (Ogden)	633	644	384	878	163	0	522	136	164	0	154	344	113	89
88th/Cork	1,129	1,010	829	2,224	163	0	1,497	970	1,479	0	629	953	344	1,280
103rd St.	999	884	844	2,936	99	0	1,516	1,787	2,258	0	425	729	98	1,596
Cicero	1,043	624	607	2,270	149	0	1,127	1,216	1,439	0	891	920	294	815
Harvey T.C.	957	596	574	2,119	119	0	976	981	1,177	0	1,070	989	334	807

Source: CTPP (2012-2016). TAZ O-D pairs are 10 miles or more apart.

The top bi-directional locations in this analysis (i.e., the locations with the potential to serve origin *and* destination locations) include:

- Rosemont Transit Center
- 88th Avenue (Cork) / I-55 Interchange
- 103rd Street
- Harvey Transportation Center

4. Service Plans

This Study culminated in two types of recommendations, 1) express bus service plans and 2) in-line stations. This section (corresponding with Task 2.1) covers the recommendations for express bus service that would take advantage of the Central Tri-State project's planned improvements and complement the infrastructure recommendations of Task 2.3.

The *Service Plans Technical Memorandum* built on the work of Task 1, Existing Conditions and Market Analysis to identify, screen, and document recommended service alignments. Annual operations and maintenance (O&M) costs were estimated for the services.

4.1 Background Prior Research

The development of service recommendations considered prior work as well as the results of a Pace staff workshop.

Previously Prepared Plans: Prior plans that were reviewed included:

- Pace & Illinois Tollway TIGER Grant Proposal: I-294 Express Bus Service (2009)
- RTA I-294 Travel Market Analysis (2016)
- Cook County Department of Transportation and Highways (CCDOTH) South Cook County Mobility Study (2019)

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. The workshop posed a series of questions using a live-polling app. Issues that were queried of participants included:

- Features of I-294 express service
- Service terminals
- Job clusters to serve

Participant comments and observations were summarized in a matrix by topic.

Existing Conditions: The Task 1.1 *Transit Service Existing Conditions Technical Memorandum*, documented existing and future transit in the I-294 Study corridor, which 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; key findings influenced the formulation of express bus service recommendations.

Market Analysis: The Task 1.3 *Market Analysis Technical Memorandum*, provided 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.

4.2 Service Design Principles and Approach

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

1. Identify terminals,
2. Design route alignments that efficiently connect terminals using I-294, and
3. Identify intermediate 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

- 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

- Focus 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.
- Support 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:
    - Ensure equitable access to high-quality transit.
    - 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 Arterial Rapid Transit Program services should be prioritized.
- Connections to CTA and Metra rail service should be prioritized where feasible.
- Use of last-mile connecting 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).

4.3 Service Designs

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 used to develop a set of alternatives for evaluation.

4.3.1 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. Possible terminals included:

- **Harvey Transportation Center**: intermodal transportation center located immediately west of the Metra Electric District (MED) Harvey Station.
- **Blue Island**: adjacent to the Metra Rock Island District (RID) Blue Island-Vermont Station and the MED Blue Island Station on Vermont Street.
- **Burr Ridge Park-n-Ride**: just south of I-55 east of County Line Road in Burr Ridge; currently serves Pace I-55 Bus on Shoulder routes.
- **Midway Transit Center**: at Chicago Midway International Airport, adjacent to the CTA's Orange Line terminal.
- **Oakbrook Center**: current Pace service transfer point is at Macy's entrance. A terminal or major stop to serve future Cermak and Roosevelt Pulse Lines may be developed.
- **Rosemont Transit Center**: adjacent to the Rosemont Station of the CTA Blue Line on River Road.
- **Elk Grove**: candidate termination points at Busse Road/IL-390 and Busse/Higgins Roads.
- **Schaumburg**: service end point is envisioned north of I-90 near Meacham Road; routes would also serve the Pace Northwest Transportation Center.

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

4.3.2 Identification of Candidate Alternatives

A review of possible combinations of terminal connections that could use I-294 were identified, which led to the following set of candidate routes:

Alternative 1 - Harvey-Elk Grove (via Rosemont): 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 from the Harvey Transportation Center to access I-294 at 159th Street. An alternative routing at the south end could involve use of local streets to access the I-294 interchange at 147th Street.

Alternative 1a - Harvey-Rosemont: This alternative was an outgrowth of the review of Alternative 1, addressing the concern for duplicating Pace Route 223. Service was truncated at the north end at the Rosemont Transit Center.

Alternative 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 operate clockwise around O'Hare Airport to terminate at the Rosemont CTA Blue Line Station. The approach from I-294 to Elk Grove would use the programmed I-490 project.

Alternative 3 - Harvey-Schaumburg (via I-290): 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.

Alternative 4 - Harvey-Schaumburg (via Busse): 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.

Alternative 5 - Blue Island-Rosemont: 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 use local streets before entering I-294 at the Cicero Avenue/127th Street interchange. After accessing I-294, it would use the same alignment as Alternative 1a to the Rosemont Transit Center.

Alternative 6 - Blue Island-Rosemont (via Oakbrook Center): This route is similar to Alternative 5 Blue Island-Rosemont, but with a deviation from I-294 to serve Oakbrook Center. This would provide more direct service to Oak Brook compared to the use of the Cermak in-line station at the far east end of the community.

Alternative 6a - Oakbrook Center-Rosemont: 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 6.

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

Alternative 8 - Harvey-Midway: 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.

Alternative 9 - Burr Ridge-Rosemont: Alternative 9 begins at the Burr Ridge Park-n-Ride; after entering I-294 at I-55, the alignment and stops would be the same as Alternative 1a.

Alternative 10 - Harvey-Oak Brook: This service would be a complement to Alternative 6a, Oak Brook-Rosemont, but with a south terminal at the Harvey Transportation 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 22nd Street and Spring Road in Oak Brook.

Alternative 11 - Blue Island-Oak Brook: This alternative is a variation to Alternative 10, with the south terminal at Blue Island rather than Harvey. The alignment between I-294 and Blue Island is the same as Alternative 7.

4.3.3 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 the Study, uniform service parameters were assumed to enable a fair assessment of impacts across the thirteen candidate routes. 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. The service assumptions used were as follows:

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 intermediate stations.

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.

Bus dwell times assumed one minute 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.

4.4 Service Evaluation

With an objective of identifying a menu of viable express bus service routes that Pace could implement, the thirteen candidate services were evaluated to identify at least one service for each of the unique travel markets studied. A key evaluation metric was the output from the application of a travel demand model.

4.4.1 Travel Demand Modeling

The Federal Transit Authority (FTA) developed the Simplified Trips-on-Project Software (STOPS) model to develop ridership forecasts to support FTA grant applications. The version of the model applied was developed for the Cook County Department of Transportation and Highways' (CCDOTH) South Cook County Mobility Study. 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 above were the inputs used in the model. No changes to existing Pace services were made. While adjustments or even complete replacements of current service may be required, testing new service with the current network in place would 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 may overstate potential boardings for some proposed routes, but the value of the analysis remains, that is, to assess comparative performance.

4.4.2 Model Results

Table 4-1 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. 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.

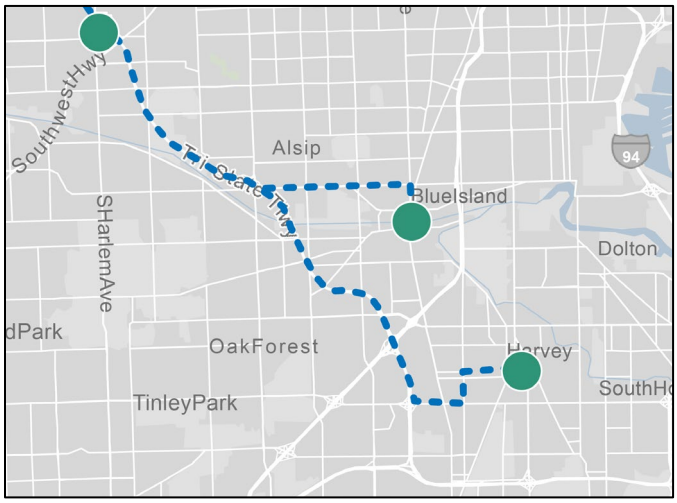
Table 4-1. 2040 Boardings by Alternative and Travel Markets Served

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

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 4-1 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.

The Harvey Transportation Center and the Blue Island terminal are less than four miles apart and have overlapping market sheds (see Figure 4-2). The Blue Island market area is accessible to the 103rd Street and Cicero in-line stations. While it was decided to not advance the Cicero/127th 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 127th Street, buses could pull-off, stop, and return to I-294 with relatively limited travel time impact. The potential demand discussed below considers these points on the relative merit of a Blue Island versus Harvey origin terminal.

Figure 4-2. Harvey versus Blue Island Market Areas



The following summarizes comparative results by alternative, and provides recommendations supported by a rationale.

1. Harvey-Elk Grove (via Rosemont): This was the best performing alternative at 4,400 boardings per day. 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 to serve Elk Grove.

1a. Harvey-Rosemont: Alternative 1a involved truncating the north end at the Rosemont Transit Center. The alternative ranked second among the thirteen alternatives. Alternative 1a was recommended to advance.

2. Harvey-Rosemont (via Busse): This service (similar to Alternative 1, except serving Elk Grove (Busse) before terminating at the Rosemont Transit Center) saw total estimated ridership 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 was not recommended to advance.

3. Harvey-Schaumburg (via I-290): While the job-rich travel market in Elk Grove would be skipped in this alignment, it would provide the quickest route from areas south to Schaumburg. The alternative 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 was 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 was recommended to advance.

5. Blue Island-Rosemont: This alternative, providing express service between Blue Island and Rosemont, attracted the third highest boardings among the thirteen routes modeled. However, it was lower than Alternative 1a Harvey-Rosemont, showing the relative strength of Harvey over

Blue Island as a southern terminal, which was found in other alternatives as well. For this reason, this alternative was not recommended to advance.

6. Blue Island-Rosemont (via Oakbrook Center): This route's deviation from I-294 to serve Oakbrook Center would add approximately three miles and 12 minutes of travel time to the route, which tempered Rosemont boardings. Given the lower boardings by deviating service, this concept was not recommended to advance.

6a. Oakbrook Center-Rosemont: Alternative 6a ranked 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. For these reasons, it was 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, the lower-performing southern terminal. Ranking twelfth among thirteen routes, this alternative was 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 ranked 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. Specifically, the portion of the route after leaving I-294 (i.e., Harlem and 95th 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 and was recommended to advance for further study.

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 Shoulder Express Bus services. The alternative ranked fourth highest, suggesting that it 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 alternative—a complement to Alternative 6a, Oak Brook-Rosemont—ranked tenth of thirteen. While overall ridership performance is comparatively low, Pace believes this alternative should advance for further study to strengthen 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. By comparison, Alternative 10 Harvey-Oak Brook had twice the number of estimated boardings. Therefore, Alternative 11 was recommended to be dropped from further study.

A summary of service recommendations is provided on Table 4-2.

Table 4-2. Summary Service 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		

4.5 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.[1] Revenue hours for each route were based on the end-to-end estimated 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[2] to estimate annual vehicle hours.

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 the vehicle hour unit cost was estimated at $80.66.

Table 4-3 provides revenue hours, vehicle hours, and estimated O&M 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).

Table 4-3. Estimated Vehicle Hours and Annual Operating Cost by Route

Alt.	Description	Annual Rev Hours	Annual Vehicle Hours	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

[1] A revenue hour is the time the bus is in service and includes recovery/layover. 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.
[2] In 2019 Pace reported 1,807,231 vehicle hours and 1,595,767 revenue hours, a ratio of 1.13 vehicle hours to revenue hours.

5. Infrastructure Design Concepts

To inform the planning for I-294 bus stations, a review of how stations have been integrated into expressways in other areas was researched. The Task 2.2 *Infrastructure Design Concepts Technical Memorandum* provided examples of a range of station configurations that can be considered to complement proposed I-294 service plans. The focus was on the layout of bus stations in limited access roadways, including key station elements such as boarding platforms and passenger access. The Technical Memorandum includes the following sections,

1. Stations Types,
2. Station Layout Examples, and
3. Assessment of Layout Types

5.1 Station Types

An aspect of the Study's service planning was to consider in-line stations that enable passengers to board and alight buses without the bus deviating from the roadway. Research shows that riders are sensitive to travel time delay when commuter services leave an alignment to serve a park-and-ride, transit facility, or an intermediate destination. Developing stations that are integrated into the tollway roadway facility (i.e., in-line stations), would offer distinct operational and market benefits, although off-line facilities may also be warranted for certain locations. In-line stations will need to be physically and operationally feasible, acceptable to the Illinois Tollway, and safe and convenient for passengers to use.

Three basic types of station designs were evaluated, including:

- Center Station where one median platform, or two side platforms, are situated in the center of the roadway (i.e., between the directional sets of traffic lanes),
- Station with Outside Platforms, involving one platform on each of the outer edges of the roadway; and
- Adjacent Station with direct access ramps.

A bus station with center platforms requires separating directional traffic lanes to create a space to accommodate one median or two side platforms. Several platform configurations are possible, as described below:

- A median platform would be shared by buses operating in both directions. Since Pace buses use right-side doors, buses would be required to enter the station from the left. One solution to address this issue is to have buses switch sides using crossover lanes before and after the bus station. An alternative is to acquire buses with left-side doors. While feasible, it would require that Pace have a sub-set fleet of vehicles that would be initially dedicated to the I-294 corridor.
- Two side platforms in the median would also be possible and would facilitate conventional right-side bus entry. The disadvantage of this design is the need to expand the roadway's overall cross-section to accommodate a second boarding platform. Also, vertical platform access by passengers would require facilities for each platform (i.e., stairs, ramps, elevators, and/or escalators).

  A variation of the two side platform design approach would be to stagger or offset the platforms to minimize the cross-sectional roadway width required.

The center station design allows vehicles to operate without deviation and would permit passengers to board and alight from the same location. Stations using outside platforms also

allow vehicles to operate without deviation, but passengers would be alighting from a location on the opposite side of the roadway (i.e., the roadway's outside shoulder) from where they boarded. This distance could exceed 200 feet depending on the number of lanes of the roadway.

The adjacent station design would require route deviation, with the impact on passenger delay being a function of the distance from the roadway and the configuration of the access ramps.

Another design concept could involve transfer facilities for bus routes serving different destinations. This would facilitate a trunk route operating on I-294 connecting with routes that have different destinations. For example, a route originating at the Harvey Transportation Center and destined for Rosemont could make a timed connection en route with a bus destined for Oak Brook.

5.2 Station Layout Examples

Examples of different bus station designs in expressways follow. Photos are used to illustrate station elements.

5.2.1 Center Station – Median Platform

Metro Transit, I-35 & 46th Street, Minneapolis, MN: I-35 is depressed at this location, and 46th Street bridges overhead. Multiple express bus routes use this stretch of I-35 South and represents Metro Transit's busiest commuter corridor. This center station design involves a median platform accessed from 46th Street. Bus lane crossovers facilitate right-side bus entry at the platform. Station bus lanes are separated from general travel lanes by a concrete barrier wall.

I-35 at 46th Street, Minneapolis

MVTA & Metro Transit Cedar Grove Transit Center, SR 77, Eagan, MN: The Cedar Grove Transit Station serves the Minnesota Valley Transit Authority (MVTA) bus system and the Metro Red Line bus rapid transit system to Mall of America. MVTA express and Red Line buses pick-up/drop-off passengers at the in-line station on Cedar Avenue. The station's single center platform allows right-side boarding, with buses performing a crossover maneuver to have left-hand running through the station area. The overhead pedestrian bridge connects to the Cedar Grove Transit Center to the east.

Cedar Grove Transit Center, SR 77, Eagan, MN

5.2.2 Center Station – Side Platforms

LA Metro Rosecrans Silver Line Station, I-110: Rosecrans is a Metro Silver Line Transitway station located in the median of I-110 (Harbor Freeway) under Rosecrans Avenue in Los Angeles, near Gardena. Service is operated by the Los Angeles County Metropolitan Transportation Authority (Metro). The Silver Line Transitway is used by multiple routes serving downtown Los Angeles. Station access is from Rosecrans Avenue using stairs and elevators. The Station has two side platforms with right-side bus entry. A 338-space park-and-ride is adjacent to the station.

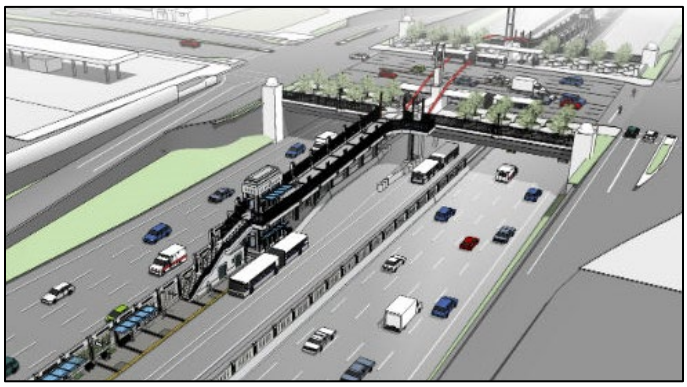
LA Metro Rosecrans Silver Line Station, I-110

I-5 Mountlake Terrace Freeway Station, Seattle: The station is served by Sound Transit Express and Community Transit commuter routes connecting Snohomish County to downtown Seattle. The station has two side platforms accessed by stairs and elevators that connect to an 890-space parking lot via an overhead pedestrian bridge. Station access is limited to the east side of the roadway.

I-5 Mountlake Terrace Freeway Station, Seattle

5.2.3 Center Station – Offset Side Platforms

San Diego SR 15 University Avenue: The University Avenue Station is part of the San Diego Rapid system and connects the suburban City of Escondido to downtown San Diego. Transit-only lanes are provided in the median from I-805 to I-8. Access to the station is from the overhead cross-street. The station layout involves two side platforms, which are staggered. The northbound platform is north of University Avenue, and the southbound platform south. Extended height barrier walls separate the station's bus lanes from the general traffic lanes.



San Diego SR 15 University Avenue

5.2.4 Outside Station Platforms

Pace I-90 Barrington Road Park-n-Ride Station: Opened in 2018, this Pace facility includes platforms on the outer of edges of I-90. The station is supported by a park-n-ride facility north of the station and a kiss-n-ride facility on the south. The was the first in-line freeway bus station in Illinois and is served by multiple Pace routes. A pedestrian bridge connects the two side platforms. Buses use slip ramps from I-90/Barrington Road ramps. Development of the station and associated elements was accommodated by the availability of vacant land.

Pace I-90 Barrington Road Station

US 36 Broomfield Bus Station, Broomfield, CO: The Flatiron Flyer opened in 2016, an 18-mile express bus service between Denver and Boulder with some elements of BRT. The service uses the US 36 Express Lanes. The Broomfield Station, with a 1,500 space parking garage, is served by exclusive bus slip ramps, and a pedestrian bridge that provides access across the freeway to the parking garage. Vehicle access to the outside platforms is via stairs and elevators. Service is operating by the Denver Regional Transit District (RTD).

US 36 Broomfield Bus Station, Broomfield, CO

5.3.5 Adjacent Stations

Rancho Bernardo Park-n-Ride, San Diego: The Rancho Bernardo Station is served by Metropolitan Transit System Rapid buses in San Diego and is at the end of Route 290 to downtown San Diego. The station serves a park-n-ride facility and required retaining walls and new bridge connections.

Rancho Bernardo Park-n-Ride, San Diego

Houston METRO Monroe Park-n-Ride, I-45 Gulf Freeway: METRO's HOV lanes are located in the center of most major Houston freeways; lanes typically are barrier-separated. Most of the 113-mile network are single lanes that operate directionally (to downtown in the AM / from in the PM). Metro has four routes that serve long approach ramps from the roadway median to off-line facilities.

Houston METRO Monroe Park-n-Ride, I-45 Gulf Freeway

5.3 Assessment of Station Layout Types

The alternative concepts for stations provide tradeoffs from multiple perspectives, which are highlighted by Table 5-1.

Table 5-1. Evaluation of Bus Station Types

Station Location & Platform Arrangement	Most Suitable as an In-Line Station	Minimize Bus Route Deviation	Minimize Walk Distance for Bus Riders	Minimize Impact to Existing Travel Lanes	Opportunities for Joint / TOD Development
Center - one median platform	*****	*****	***	**	*
Center - two side platforms	*****	*****	***	*	*
Center - two side platforms offset	*****	*****	***	***	*
Outside - one platform each side	***	****	*	****	***
Adjacent with direct access ramps	*	*	*****	*****	*****
Transfer Station	*	*****	N/A	*****	*

*****best meeting criteria; *least meeting criteria; N/A: Not Applicable*

A narrative assessment of each design follows.

Center - One Median Platform: This is a very effective in-line layout and would eliminate the need for route deviation for pick-up and drop-off of passengers. It works best when access is from a roadway over or under the freeway with local bus service (versus from a ped bridge). Use of right-side bus entry is an issue; the use of cross-over lanes to resolve adds other issues. The design requires only one set of vertical access means (e.g., stairs / elevator). Walk-on and park-n-ride access require some additional walking. Retrofitting this design into an existing roadway would require lane shifts to create the required space for the platform and bus lanes. It offers limited opportunity for transit-oriented development (TOD).

Center - Two Side Platforms: This design option has many of the same in-line station characteristics as the Center Platform design. An advantage is right-side bus entry, so the crossover lanes before and after the station would not be required. Disadvantages would be the extra width required for a second platform, and the need for a second set of vertical access means (e.g., stairs / elevator). Similar to the Center - One Median Platform design, there would be limited opportunity for TOD.

Center - Two Side Platforms Offset: This option would be very similar to the Center - Two Side Platform option, with the exception of placing the platforms offset from one-another. This would provide the advantage of reducing the cross-sectional width of the station between the roadway's general travel lanes.

Outside - One Platform each Side: This option would not require deviating from the roadway for pick-up/drop-off but use of the center Flex Lane for express operations could be problematic based on traffic conditions. The separation of AM versus PM boarding/alighting locations would be somewhat inconvenient for riders. A major advantage is the roadway travel lanes would not

require shifting. There could be opportunities for TOD, although the separation of boarding and alighting locations could be a limiting factor.

Adjacent with Direct Access Ramps: The principal disadvantage of this design is that buses would be required to leave the roadway for pick-up/drop-off; the added travel time would be a function of the location of the off-line station and the design of the on/off ramps. Walk access from park-n-ride facilities would be minimized and the station itself would have no impact on the general travel lanes. However, access ramps to serve the station could be an issue, depending on the site conditions of the area. The ramp systems would likely be costly to build. There would be opportunity for TOD.

Transfer Station: This would be a very feasible design to implement but would offer relatively few benefits given that passengers would not be able to access or egress the location. This could provide some operational efficiencies, which would be offset by the addition of another seat ride for affected passengers.

6. Station Concepts

The Study proposed infrastructure improvements that would create express bus passenger access points on I-294 and I-90. These in-line stations would enable Pace service to take advantage of the Central Tri-State project's planned improvements as well as allow buses to efficiently operate service without the need to deviate from the Tollway facility.

Infrastructure recommendations built on earlier tasks, including the generic review of infrastructure concepts of Task 2.2 *Infrastructure Design Concepts Technical Memorandum*. Layouts for three in-line stations were developed, which included station elements such as exit/entry bus ramps, boarding platforms, passenger circulation, parking, and vehicular access improvements. Various sources were researched and documented for planning expressway bus stations. Selecting the three locations for study was the product of a process to identify candidate locations and several screening steps that considered physical feasibility and potential demand. The sizing and dimensions of station facilities from cited research documents were factors used in screening. The Study also estimated capital costs for the three short-listed locations.

6.1 Station Planning Guidelines

Guidelines and standards on the planning and design of expressway stations helped inform the recommendations and conceptual design of I-294 in-line stations. Source documents included the following:

- *Bus Use of Highways, Planning and Design Guidelines*, National Cooperative Highway Research Program (NCHRP) Report 155, Transportation Research Board (TRB), 1975
- *HOV Systems Manual*, NCHRP, TRB, Report 414, 1998
- *Land Use Policies and Strategies for Expressway-Based Bus Rapid Transit, A Guide for Municipalities and Transportation Providers*, Chicago Metropolitan Agency for Planning (CMAP), July 2012
- *Transit Supportive Guidelines for the Chicagoland Region*, Pace, 2013
- *Guide for Geometric Design of Transit Facilities on Highways and Streets*, American Association of State Highway and Transportation Officials (AASHTO), 2014
- *Roadway Design Criteria*, Illinois State Toll Highway Authority, 2018
- *A Policy on Geometric Design of Highways and Streets*, 7th Edition, AASHTO, 2018

Pace's I-90 Barrington Road Park-n-Ride facility was another planning and design guideline source. This facility was Pace's first in-line bus station, which opened in August 2018.

Overall, the guidance indicated that stops should be placed in areas of high passenger production of origins or attraction of destinations. Spacing of stations in areas of suburban development patterns characteristic of the I-294 corridor generally should be comparatively wide, where many passengers arrive an origin station by personal vehicle. Wide station spacing allows express buses to operate at higher speeds.

Key sizing and dimensions that were especially useful to the siting and layout of stations were:

- **Passenger Loading Area**: For an in-line station with the platform on the outside of the roadway lanes, 61 feet are needed from the edge of main line pavement. This includes space for the main line shoulder (11 feet), barrier wall (7 feet), buffer between barrier wall and bus passing lane (4 feet), bus passing lane (12 feet), bus loading zone (12 feet), and platform (15 feet).

Note while the use of center platforms were given early consideration, as the identification and evaluation of sites progressed it was felt that placement of a platform or platforms between the main traffic lanes would be overly complicated and costly as a retrofit of the roadway. This was also related to the fact that the Central Tri-State project (Balmoral Avenue to 95th Street) design work was nearly complete, and release of construction documents was expected in the near future.

- **Platforms**: Platform size was based on the dimensions of the Pace I-90 Barrington Road facility, at a length of 100 feet and width of 15 feet. There was some uncertainty if this length would accommodate two buses at one time. As the project advances to the next stage, the length should be revisited. Platforms should be designed to serve two buses.

- **Passenger Access / Circulation**: An important element of passenger circulation is the ability to return to a boarding location at a station from the return trip. This is complicated by the need to cross a multi-lane freeway. Several options are available, including:
    - Pedestrian bridge over the freeway,
    - A tunnel under the freeway, or
    - Use of an existing roadway bridge.

  Use of a pedestrian bridge versus a tunnel could be a function of the local topography, for example, a raised right-of-way (ROW) could result in a tunnel being more feasible than a bridge. However, considering that the distance to be spanned will be 200 feet or more, there may be issues of constructability and safety that would make a tunnel less viable. The Illinois Tollway's vertical clearance requirement for interstate overhead bridges is 16 feet 5 inches (*Structure Design Manual*, Illinois Tollway, March 2021). Use of existing roadway bridges could be the more cost-effective option, especially if sufficiently wide sidewalks are present. The design solution to advance will be depend on the specific characteristics of each respective site.

  Whatever the means proposed to span the roadway, passengers will be confronted with the need to traverse vertical distances from a platform. To comply with ADA requirements, these elements will involve elevators or ramps. Stairways can also be included for able-bodied passengers. Again, the preferred approach will depend on site-specific conditions.

- **Exit/Entry Bus Lanes**: Key elements of in-line stations are exit and entry lanes to allow buses to decelerate, stand, and accelerate on pavement areas separated from the main traffic lanes. Acceleration/deceleration lanes need to be long enough to enable the bus to leave and enter the travel lane at roughly the average running speed of the through lanes. Establishing these lane lengths was important in siting and laying out stations. Factors such as ROW availability and geometric constraints of the existing roadway, and planned improvements would be affected by these dimensions.

  The appropriate exit/entry lane length was determined from applicable Illinois Tollway, Pace, and AASHTO standards. A minimum turnout length of 3,280 feet was recommended as a base requirement for potential stations. Table 6-1 breaks down the lengths that are associated with each of the component parts. It should be noted that roadway conditions for individual sites could require some variation in the dimension parameters. It is also important to note that this dimension is being used for screening purposes to inform the high-level conceptual layouts, and not for final design of station facilities.

Table 6-1. Exit/Entry Bus Lane Length by Component

Element	Speed Change	Length (feet)	Source
Exit Taper	70mph	250	Tollway
Exit Ramp	70 to 30mph	520	Tollway & ASSHTO
Deceleration Length	30 to 0mph	100	Tollway & ASSHTO
Platform Turnout	To 0mph	62	Pace
Platform (one bus)	Standing	100	Pace
Platform Return	from 0mph	38	Pace
Acceleration Length	0 to 35mph	330	Tollway & ASSHTO
Entrance Ramp	35 to 70mph	1,290	Tollway & ASSHTO
Transition Taper	70mph	590	Tollway
Total Minimum Improvement Length		**3,280**	

6.2 Identification of Candidate Station Locations

Possible station locations were derived from technical memoranda from the Study and from previous studies by Pace and others. Sources of candidate locations included the following:

Market Analysis Technical Memorandum: general locations were identified as a part of the segmenting of the Study Corridor into polygons.

Pace Suggested Locations: Pace conveyed to the Study Team a summary of issues and ideas from prior staff discussions, which included possible stations locations. These and other locations were also discussed with Illinois Tollway staff in a brainstorming call held in June 2020.

TIGER Grant Proposal: I-294 Express Bus Service (Pace, 2009): application included eleven proposed stations, seven of which were in-line stations.

I-294 Travel Market Analysis (RTA, 2016): eleven stations were assumed as a part of a travel demand study.

South Cook County Mobility Study (CCDOTH, 2018): Express bus service between Harvey and Rosemont was modeled assuming eleven stations.

Table 6-2 lists the 32 unique station locations by source. Station sites are listed in geographic order, south to north. Shaded locations have been removed from further consideration as part of the first step of the screening process. Ten locations outside of the Study Area or off-line sites were dropped. Off-line locations are not near I-294 or I-90, and thus would not be a candidate for an express bus station.

Table 6-2. I-294 Possible Express Bus Stations by Source

	Route	Location	Pace Ideas	Market Analysis	TIGER App	RTA STOPS	South Cook	Reason for Elimination
1	I-294	Lincoln Oasis			X	X		Outside of study area
2	Off-line	Homewood Park-n-Ride			X			Off-line
3	Off-line	Harvey Transportation Center	X	X	X		X	Off-line
4	I-294	159th Street	X		X	X		
5	I-294	147th Street					X	
6	I-294	139th Street / Midlothian Turnpike	X				X	
7	I-294	131st Street	X					
8	Off-line	Blue Island Park-n-Ride			X			Off-line
9	I-294	Cicero / 127th Street		X	X	X	X	
10	I-294	103rd Street	X	X				
11	I-294	95th Street			X	X	X	
12	I-294	Toll Plazas 36 & 39, Justice	X					
13	I-294	88th Avenue / Cork Avenue	X	X				
14	I-294	75th Street	X		X	X	X	
15	I-294	Hinsdale Oasis (former)	X	X			X	
16	I-294	Ogden Avenue		X	X	X		
17	Off-line	Oakbrook Center	X		X		X	Off-line
18	I-294	Cermak Toll Plaza	X	X				
19	I-294	Roosevelt Road		X		X		
20	I-294	North Avenue	X	X				
21	I-294	Grand Avenue				X		
22	I-294	O'Hare Oasis (former)	X	X	X			
23	I-294	Rosemont Entertainment Dist.	X				X	
24	Off-line	Rosemont Convention Center					X	Off-line
25	Off-line	Rosemont Transit Center		X	X		X	Off-line
26	I-90	Touhy Avenue		X				
27	I-90	Busse Road		X				
28	I-90	Arlington Heights Road						
29	I-90	Meacham Road	X					
30	IL-390	IL-390 / Busse				X		Outside of study area
31	I-290	Devon Avenue				X		Outside of study area
32	Off-line	Northwest Transportation Center		X		X		Off-line

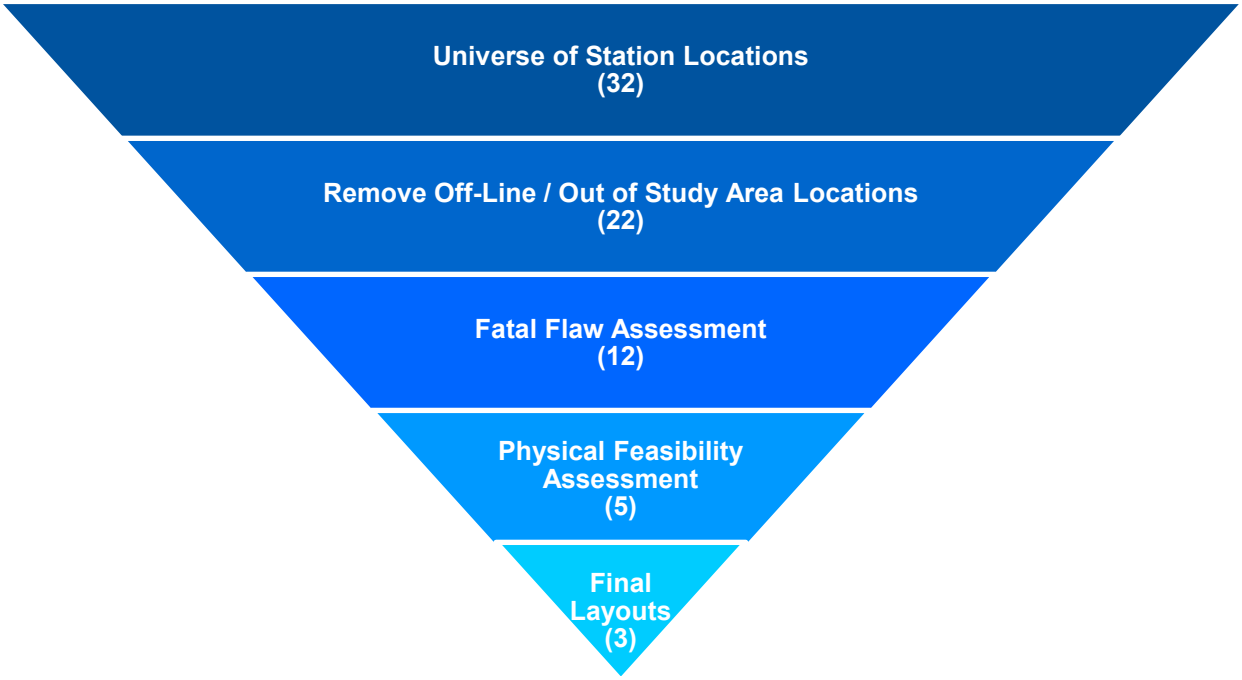
6.3 Station Location Screening Process

In reducing 22 candidate station locations to three, the screening sought the following objectives:

- Be physically feasible and not have excessive costs,
- Be spaced wide enough apart to serve distinct market areas, and
- Have the potential to attract the greatest number of users.

The step-wise screening process used was akin to a funnel, where after each step, the number of candidate study locations was reduced. The screening process is graphically represented in Figure 6-1. The number in paratheses represents the stations remaining at the end of each step in the screening process.

Figure 6-1. Station Location Screening Process



6.4 Fatal Flaw Assessment

Results of the fatal flaw review of the feasibility of the 22 locations identified in Table 6-2 are presented in Table 6-3. Shaded locations did not advance, leaving twelve locations for the detailed review of the physical feasibility.

Table 6-3. Fatal Flaw Assessments - Results

	Route	Location	Reason for Elimination
1	I-294	159th Street	Can be off-line
2	I-294	147th Street	Conflict with I-57 ramps
3	I-294	139th Street / Midlothian Turnpike	
4	I-294	131st Street	
5	I-294	Cicero / 127th Street	
6	I-294	103rd Street	
7	I-294	95th Street	Cloverleaf design, proximity to Harlem Interchange
8	I-294	Toll Plazas 36 & 39, Justice	Limited access to roadway network
9	I-294	88th Avenue / Cork Avenue	
10	I-294	75th Street	Complex ramp system
11	I-294	Hinsdale Oasis (former)	Isolated sites; limited access to roadway network
12	I-294	Ogden Avenue	Cloverleaf design
13	I-294	Cermak Toll Plaza	
14	I-294	Roosevelt Road	Complex ramp system
15	I-294	North Avenue	Complex ramp system
16	I-294	Grand Avenue	
17	I-294	O'Hare Oasis (former)	
18	I-294	Rosemont Entertainment Dist.	
19	I-90	Touhy Avenue	
20	I-90	Busse Road	
21	I-90	Arlington Heights Road	Partial cloverleaf design
22	I-90	Meacham Road	

6.5 Physical Feasibility Assessment

Twelve screened locations were reviewed for physical feasibility. The planning guideline's sizing and dimension requirements were used to identify constraints that station infrastructure would need to address. Each review was based on high-level conceptual designs for the placement of platforms and exit/entry ramps.

As can be seen in Table 6-4, seven (shaded) of the twelve station locations that survived the fatal flaw screening were recommended to not advance. In most cases, the reason for dropping was related to an anticipated high cost to widen bridges or relocate retaining walls. It is important to note that these locations are not necessarily infeasible, rather, they were judged as requiring higher investment levels compared to the five locations deemed to be most constructible.

Table 6-4. Physical Feasibility Assessments - Results

#	Route	Location	Reason to Not Advance
1	I-294	139th St/Midlothian Turnpike	Impacts bridges
2	I-294	131st Street	Conflicts with ramps
3	I-294	Cicero / 127th Street	
4	I-294	103rd Street	
5	I-294	88th Avenue/Cork Avenue	Affects nearby interchange
6	I-294	Cermak Toll Plaza	
7	I-294	Grand Avenue	Requires extensive retaining walls
8	I-294	O'Hare Oasis (former)	
9	I-294	Balmoral, Rosemont Ent. Dist.	Affects nearby interchange
10	I-90	Touhy Avenue	Requires extensive retaining walls
11	I-90	Busse Road	Requires extensive retaining walls
12	I-90	Meacham Road	

6.6 Final Screen of Locations

Table 6-4 includes the five locations to advance for further study. The objective of this final screening is to narrow the number of station locations to three for preparation of concept layouts. Since advancing stations that would have the greatest likelihood for success in attracting passengers was another objective, the screening methodology that follows emphasizes factors that address demand. Table 6-5 includes the locations to be subjected to final screening.

An initial factor to consider is the spacing of stations. A wider separation between boarding locations is preferred to allow express buses to operate at higher speeds and to minimize overlap in station passenger market sheds. A spacing of at least two miles is recommended by AASHTO (Guide for Geometric Design of Transit Facilities on Highways and Streets, AASHTO, 2014). As shown on Table 6-5, distances between the proposed station locations are well above the 2-mile threshold, and as a result, none should be removed for this reason.

Table 6-5. In-Line Station Locations for Final Screening

#	Tollway Route	Location	Miles between Stops
		159 Street (off-line)	
1	I-294	Cicero / 127th Street	5.7
2	I-294	103rd Street	4.2
3	I-294	Cermak Toll Plaza	15.6
4	I-294	O'Hare Oasis (former)	6.0
5	I-90	Meacham Road	13.9

Evaluation criteria used in screening locations are grouped into two categories: 1) passenger demand / market potential and 2) station access / connectivity. Evaluation factors are listed below.

- **Socio-Economic** - CMAP 2050 population and job densities by station site polygon
- **Transit Demand Index** - from Pace's Driving Innovation Plan, results of Gap Analysis tool
- **Travel Demand Forecasts** - from Study's application of the STOPS model
- **Transit Supportive Development** - potential for transit-oriented development
- **Station Park-n-Ride Access** - measured by potential parking spaces
- **Transit Connectively** - number of current and proposed bus routes within half mile of sites and passenger rail stations within one mile

Using the evaluation factors above, station sites were assigned ratings using a 5-point scale, where five represents a very high comparative score and one a very low score. The scores generally represented the rank for stations.

Table 6-6 presents the evaluation results. The 103rd Street site performed significantly higher than the other four locations (i.e., score of 4.29), while Cicero/127th Street had the lowest performance (2.29). The O'Hare Oasis performance at 3.21 ranked next best after 103rd, significantly above the next two (Cermak and Meacham). The high employment density of Cermak would favor this location, since proximality to jobs is considered an important attribute of sites. While the station catchment area for originating riders can be expanded with the availability of parking, market areas for station destinations can be limited by the availability and convenience of last mile connections. Passenger preference is to be able to walk to final destinations, in part, to eliminate the need to transfer to another vehicle. Cermak is recommended over Meacham.

Table 6-6. Final Station Location Evaluation Matrix

Variable	Cicero / 127th St.	103rd Street	Cermak Toll Plaza	O'Hare Oasis (former)	Meacham Road
2050 Population Density	3	4	1	5	2
2050 Job Density	1	2	5	2.5	2.5
Gap Analysis Index	3	4	2	4	3
2040 Boardings	3	5	4	2	3
TOD Potential	1	5	2	4	3
Park-n-Ride Potential	3	5	4	2	2
Transit Connections	2	5	2	2	4
Average Score	2.29	**4.29**	**2.86**	**3.07**	2.79
Color Key:	*1. very low*	*2. low*	*3. medium*	*4. high*	*very high*

6.7 Conceptual Station Layouts

Conceptual designs for the three screened station locations were prepared. The layouts include the key elements of stations – bus turnout lanes, platforms, infrastructure to accommodate passenger circulation and vehicle access, ROW, and drainage improvements. It should be emphasized that the concept designs are at a high level, and do not reflect data from topographic surveys or engineering and environmental studies. The concepts provide stakeholders and the public information to assess potential impacts and benefits of the proposed facilities. The level of detail of the layouts also facilitated estimating capital costs.

6.7.1 103rd Street

The proposed station at 103rd Street near Harlem Avenue in Chicago Ridge will ideally be integrated into the redevelopment of the former trucking terminal facility. Since redevelopment plans have yet to be formulated, some elements to the proposed layout may change, including, for example, parking, access roads and pedestrian links. The following provides a description of the elements of the conceptual plan.

Northbound side (east): The bus exit/entry lane was able to fit between the Stoney Creek culvert and the Harlem Avenue Bridge. The area along the east side of I-294 will require a retaining wall and/or pier structure to support the platform and the ramp providing access to the overhead bridge. A 72-space parking lot would access from Virginia Avenue. A sidewalk from Virginia Avenue along the parking lot would connect to the platform.

Overhead Pedestrian Bridge: The bridge is assumed to be enclosed, similar to the structure at Pace's I-90 Barrington Road Park-n-Ride facility.

Southbound side (west): The bus exit/entry lane would avoid the Harlem Avenue and Southwest Highway Bridges but would extend over the Stoney Creek culvert. The integrity of this structure will need to be verified in a subsequent project phase. The ramp from the pedestrian bridge would descend northward to the platform. A stairway from the north end of the southbound platform would lead to the proposed sidewalk connection to Harlem Avenue.

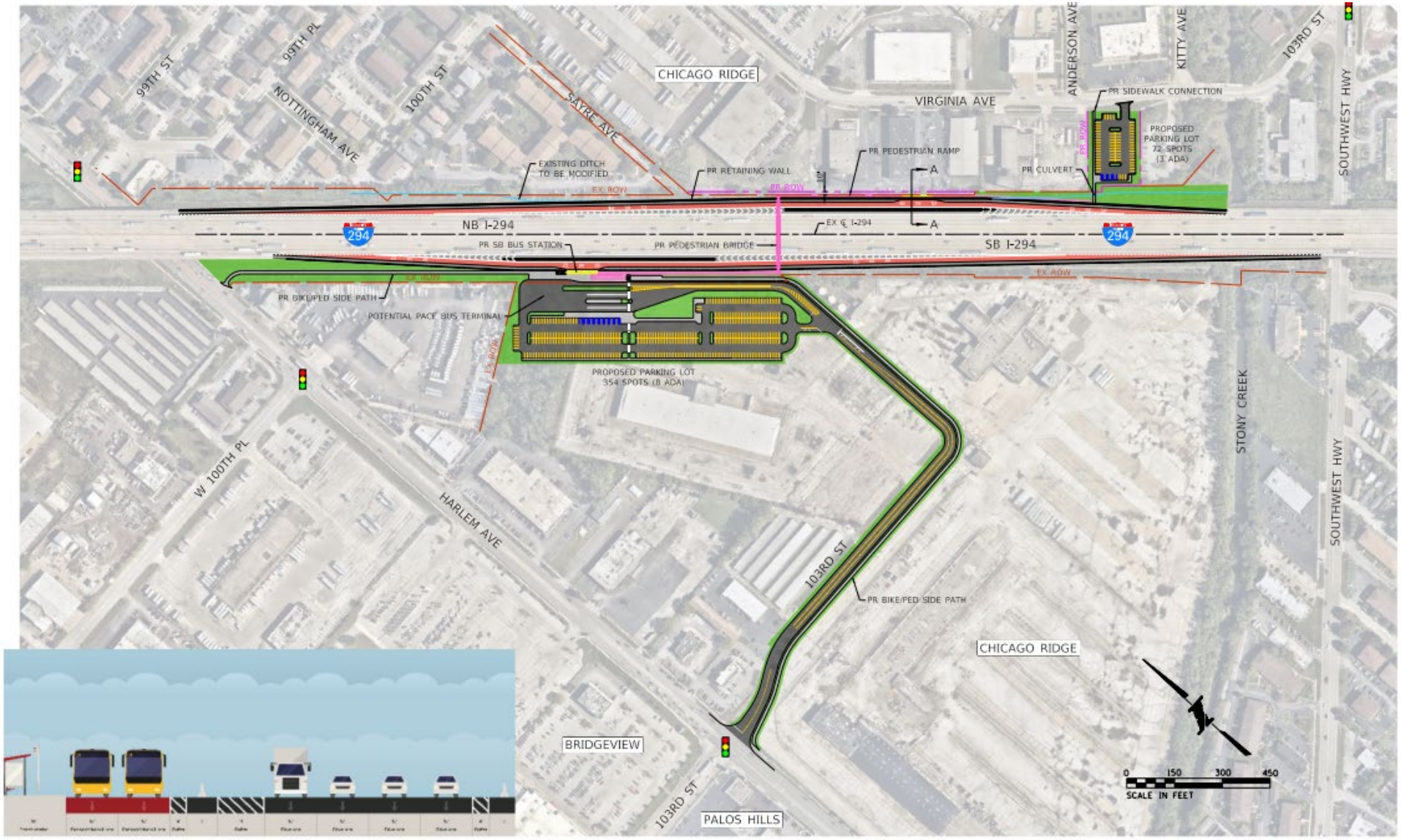
Other station elements on the west side include a bus drop-off lane adjacent to the station platform, a bus turnaround leading to a new layover terminal with two bus berths, and parking for 354 vehicles. The bus terminal could be implemented later as part of a Pulse Line project.

Vehicle access from Harlem Avenue would be provided by a drive from the signalized intersection of 103rd Street and Harlem Avenue.

Redevelopment plans for the west side are not currently known, so it is not possible to say how these station improvements could be integrated into the larger development. Ideally, planning for both initiatives would be performed concurrently, maximizing the potential of the site.

Station layout drawings are included as Figure 6-2 and Figure 6-3.

Figure 6-2. 103rd Street Station Layout



SECTION A-A

Figure 6-3. 103rd Street Station Rendering

pace Regional Transportation Authority

PACE I-294 MARKET & FACILITIES ASSESSMENT
103RD STREET STATION, CHICAGO RIDGE

May 2021

6.7.2 Cermak Toll Plaza

The Cermak station site is at the Toll Plaza north of Cermak Road. With the Illinois Tollway's transition to all-electronic tolling, the space presently used for cash toll lanes will be available for other uses. The conceptual station design was prepared to minimize the footprint required for station elements, giving the Illinois Tollway flexibility to choose other possible uses later.

Northbound side (east) improvements would be south of the Toll Plaza building and communication tower, leaving ROW north of this location available for other uses. A parking facility of 130 spaces would be provided. Vehicle access from Cermak Road would be provided by a new roadway on a Queen of Heaven Catholic Cemetery & Mausoleums ROW.

Southbound side (west) improvements would include modifications to the Collector-Distributor (C-D) roadway system to serve the station. The platform would be angled to maximize space on the site for other Tollway-related uses to the south while avoiding ROW acquisition. The station platform and bus loading zone would be on Illinois Tollway ROW, but the one-way drive lane would be on privately owned ROW. No parking would be provided on the west side.

Pedestrian bridge would be accessed by ramps that would connect the two platforms.

Drawings are provided on Figure 6-4 and Figure 6-5.

Figure 6-4. Cermak Station Layout

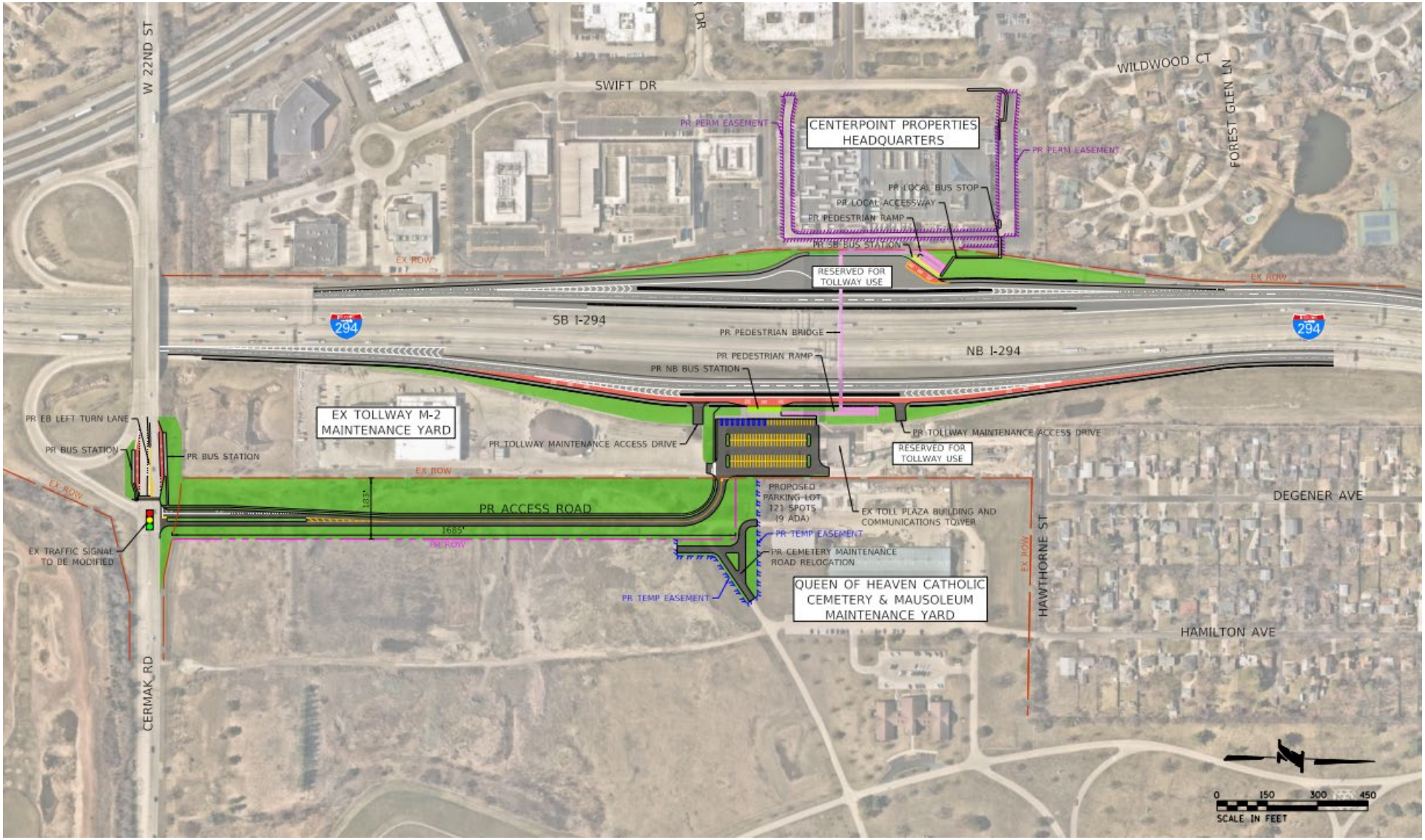


Figure 6-5. Cermak Station Layout Rendering

pace | Regional Transportation Authority

PACE I-294 MARKET & FACILITIES ASSESSMENT
CERMAK ROAD STATION

May 2021

6.7.3 O'Hare Oasis (former)

The elimination of the O'Hare Oasis created available ROW that can potentially be used for an in-line express bus station. A gas station and truck parking on each side of I-294 remain, and it is assumed that both activities will continue, although the truck parking may be reconfigured or relocated. The larger area including the former Oasis and the Irving Park Road partial interchange has been the subject of a study led by the Illinois Tollway to develop a full interchange. Based on preliminary drawings from this feasibility study, it appears that a station would be feasible should new ramps be constructed at the former Oasis or at Irving Park Road. However, how the elements of a station are placed will be affected by the possible interchange. In addition, the Village of Schiller Park has expressed interest in new development for the Oasis site. It is understood that plans have yet to be formulated.

In the absence of definitive plans for an interchange or private development, the station design was developed using current site conditions and roadway geometry. Given the potential range of design options for the site's redevelopment, a simplified layout was proposed to present a viable concept for designers of the possible interchange as well as redevelopment plans.

Figure 6-6 and Figure 6-7 illustrate how the elements of a station could be placed on the site. For both the northbound (east) and southbound (west), buses would use the service drive for vehicles leaving the gas stations to return to I-294. Unlike the other two station layouts, ramps would not be needed to access the pedestrian bridge. It is also important to note that the Illinois Tollway has committed to constructing a pedestrian bridge to replace pedestrian access that was afforded by the Oasis, which spanned I-294. Coordinating the location of this improvement with the design of the station would be advantageous to both the community and Pace.

Sidewalk connections will link the Oasis site to the adjacent street grid. On the east side, a new sidewalk extending west from Seymour Avenue would cross over an existing Tollway culvert before meeting a vertical access point for pedestrians, allowing for both stair and ramp access. Introduction of a Rectangular Rapid Flashing Beacon (RRFB) signal at the proposed crosswalk with the truck parking lot would allow for a safer, actuated crossing for pedestrians. Pedestrians on the west side of I-294 would access the station via a new sidewalk connection along the west side of the existing frontage road. Extension of an existing culvert would be required to accommodate this link to Belle Plaine Avenue.

Figure 6-6. O'Hare Oasis Station Layout

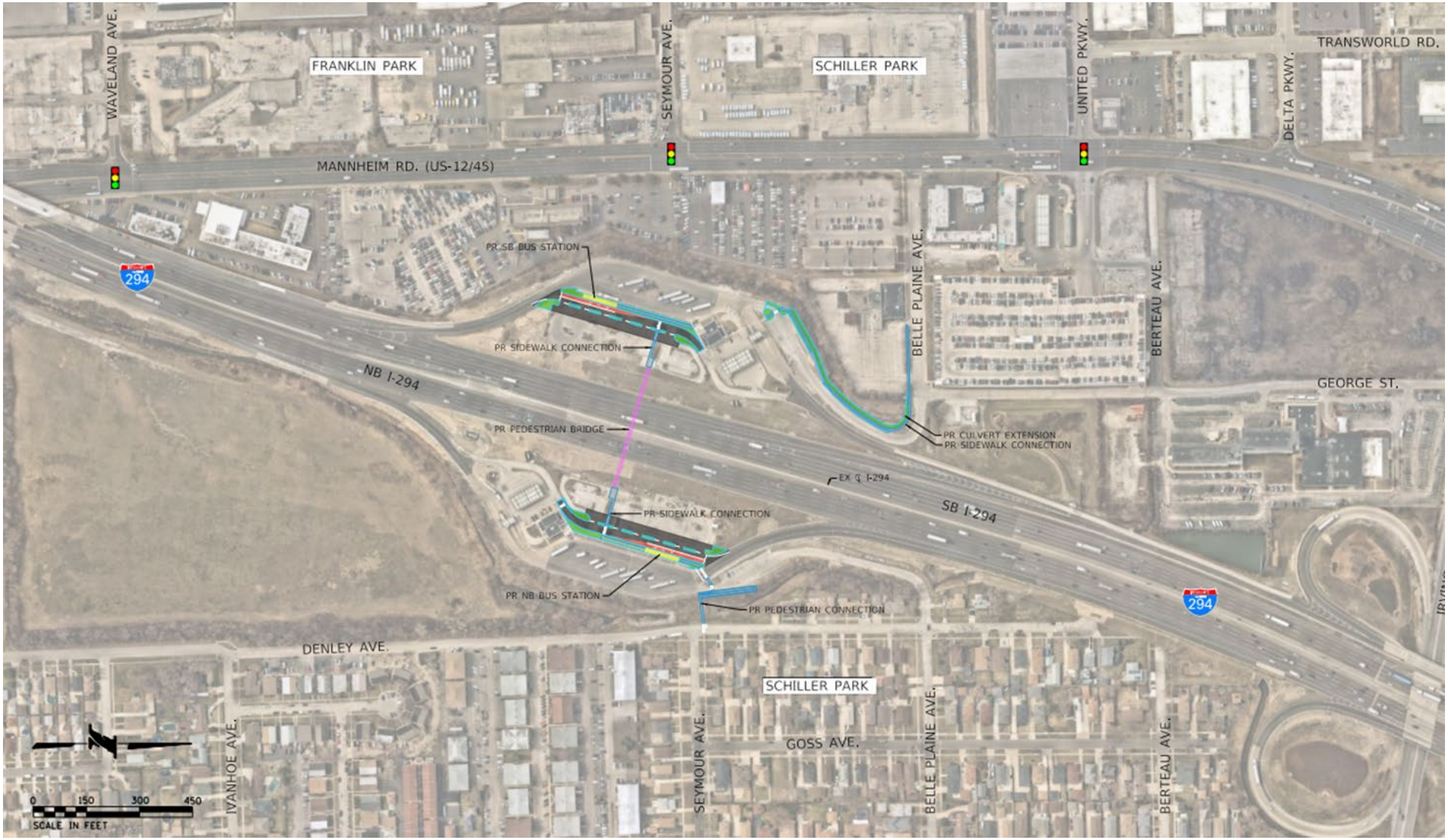
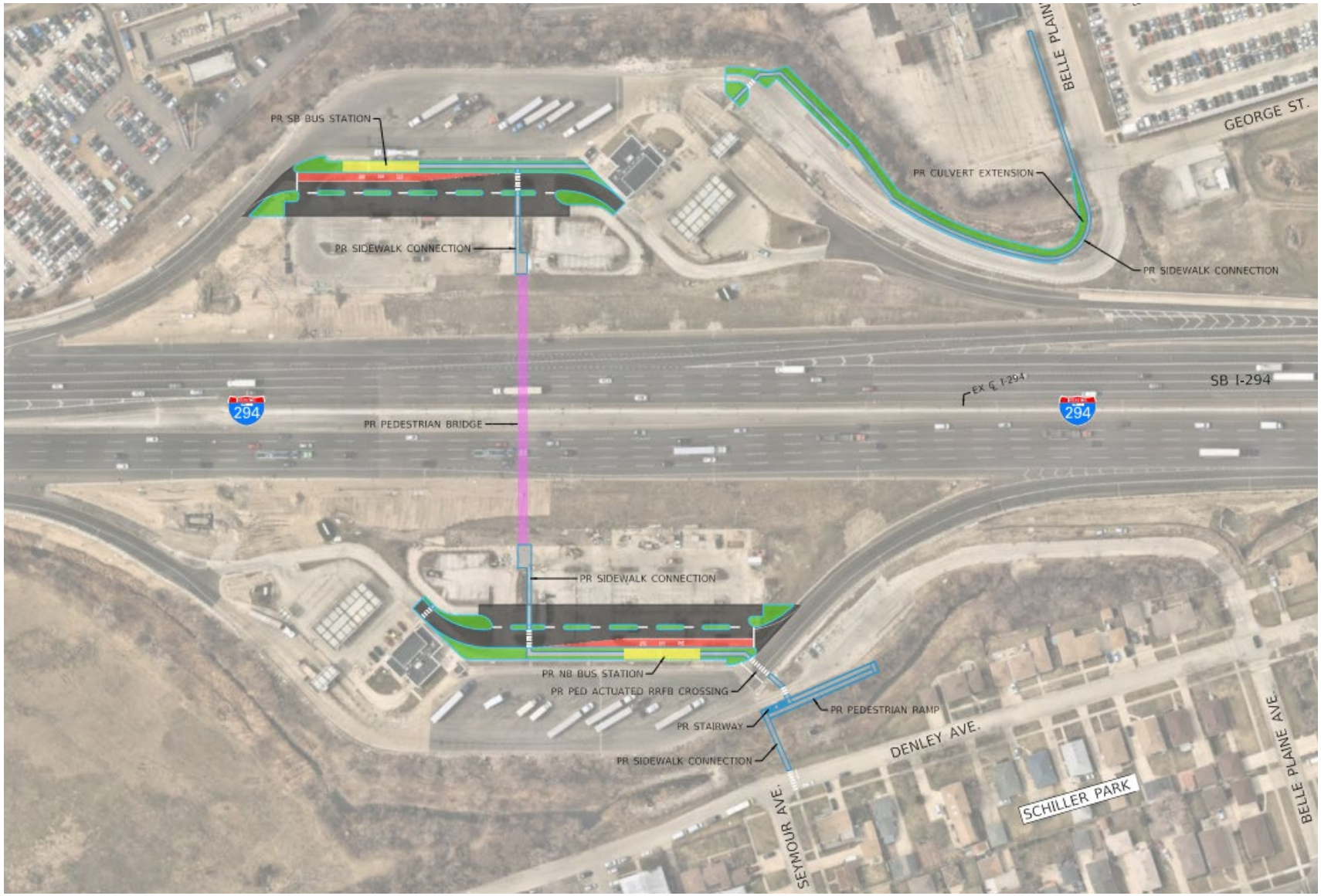


Figure 6-7. O'Hare Oasis Station Layout Detail



6.8 Capital Costs

The estimated cost to build the required infrastructure for the three in-line stations were developed using the FTA Standard Cost Categories (SCC) structure, which provides a consistent format for estimating costs for Capital Investment Grant (CIG) Program projects. While the stations will not likely be funded by an FTA CIG, the costing methodology would be consistent with that used for Pace's Pulse program.

Estimates were developed to represent the total costs to construct the facilities even though some elements may be funded fully or in part by others. For example, if it can be demonstrated that a pedestrian bridge will be used by local residents, the community or Illinois Tollway may be willing the fund some of the cost. Or, as private development plans for the 103rd Street and O'Hare Oasis sites advance, developers may agree to fund shared assets such as local roads or sidewalks. As Pace develops financing plans to advance the station projects, contributions by others can be used as a local match for grants or the grant request can be reduced.

Two levels of investment were assumed: 1) Build-out and 2) Opening Day. Build-out represents constructing all elements reflected on the concept layouts. One exception was the two-bay bus terminal at 103rd Street, which was assumed to be funded by a future Pulse Line. Opening Day includes the required infrastructure needed to introduce express bus service, and quantities are reduced for some elements. For example, since parking capacity was based of 2040 forecasts, initiating service with fewer parking spaces could be a strategy to reduce costs. As demand matures over time, parking capacity can be expanded. Another element of the Opening Day version was differences in the design of some facilities. The intent was to offer possible opportunities for cost savings to help match costs to available funding.

6.8.1 Estimated Capital Costs

Estimates of capital costs by station are presented on Table 6-7, which are expressed in 2021 dollars.

Table 6-7. Estimated Capital Costs by Station in 2021 $

	103rd Street	Cermak	O'Hare Oasis	Total
Opening Day	$47,476,000	$35,489,000	$10,995,000	$93,960,000
Build-Out	$58,352,000	$41,300,000	$10,995,000	$110,647,000

Following are highlights of the station costs, pinpointing specific elements that are driving the costs and describing differences between Build-out and Opening Day.

103rd Street: Since I-294 is on an embankment at this location, extending out the roadway width will require replacement or formation of new retaining walls. In addition, existing sound walls will need to be relocated or replaced. The east side has constrained right-of-way (ROW) and a ditch, which will need to be accommodated. The west side affords an open footprint to install infrastructure, however, the distance to Harlem Avenue will require more significant vehicle and pedestrian access improvements. The site is not within the limits of the Illinois Tollway's Central Tri-State Tollway (I-294) Project, which has a southern limit of 95th Street. Following are elements that contribute the most to the estimated cost.

- Exit/entry bus lanes, shoulders, and barrier walls account for between 14 and 17 percent, including soft costs and contingencies. The investment requirements would be the same for Build-out and Opening Day.
- Retaining Walls / Sound Walls account for an estimated 26 to 31 percent and would be the same for both versions.

- Pedestrian bridge and ramps costs would be about 28 percent. The Opening Day version assumes a narrower ramp (8 feet), reducing costs by over $2 million. The bridge was priced as a fully enclosed structure, similar to the Barrington Road facility. Ramps would be covered and include support piers, sidewalls, hand rails, and lighting.
- West side access improvements would represent 20 percent of the Build-out costs, and would include a bus loop, upgrade/extension of 103rd Street between Harlem Avenue and the station, a bike trail adjacent to 103rd Street, and construction of 354 parking spaces. The improvements for the Opening Day version would account for 9 percent of total costs, and would not include a bus loop, only the extension of 103rd Street, no bike trail, and parking for 116 vehicles.

Cermak: The development of a station on the footprint previously used for cash toll collection is proposed to be a part of the Illinois Tollway's realignment of the parallel Collector-Distributor (C-D) Road ramps between Cermak and Roosevelt Roads. The station's conceptual design minimized the amount of land that would be used for platforms and bus lanes to preserve space for future uses by the Illinois Tollway. The station also requires an access drive to Cermak Road to the south. Acquisition of an easement from the private development on the west side was also proposed to enable vehicle and pedestrian access to Swift Drive. The site is not elevated from the general terrain. Existing sound walls at the north end of the site will not be impacted. Major cost items included the following:

- Exit/entry bus lanes, shoulders, and barrier walls account for between 28 and 32 percent, including soft costs and contingencies. The investment requirements would be the same for Build-out and Opening Day. As noted above, these improvements would be part of the Illinois Tollway's realignment of the parallel C-D Road ramps.
- Pedestrian bridge and ramp costs would represent a third of the estimated costs. Compared to 103rd Street, the Cermak bridge would be almost twice as costly. At Cermak, the bridge would span both the main travel lanes as well as the area previously used for toll collection. The premise to leave the maximum space for Illinois Tollway future uses meant that platforms were pushed to the outer edges of the former toll collection area, causing the bridge to be longer. The Cermak bridge would be 482 feet compared to the length of the 103rd span of 249 feet. The ramp costs, on the other hand, would less for Cermak compared to 103rd Street due to a shorter length (852 versus 1,562 feet, respectively). This difference is because the elevation of I-294 at 103rd is roughly 10 feet higher than the parking lots, whereas at Cermak, the parking lot is essentially level with the mainline lanes of I-294. The bridge cost would be the same for Build-out and Opening Day, but the ramp cost for Opening Day would be 20 percent less assuming use of an 8-foot wide ramp versus the Build-out ramp width of 10 feet.
- Access improvements account for 12 percent of total costs. This includes parking capacity of 130 spaces (same for Build-out and Opening Day) and drive access from Cermak Road. The roadway from Cermak on the east side would use Queen of Heaven Catholic Cemetery property and would require realigning the Cemetery maintenance roads. For Opening Day infrastructure, the road connecting to Cermak Road would use only the southernmost part of the Cemetery property, eliminating the need to realign the Cemetery maintenance road. The lane improvements proposed on the west side would be dropped. These changes would reduce the Open Day version by approximately $400,000.
- Land costs were estimated to account for over 10 percent of Build-out costs. For Opening Day, it was assumed that instead of 7 acres being acquired from the Cemetery, less than 2 acres would be needed. The acquisition of a permanent easement on the west side would not be pursued for the Opening Day scenario. This would reduce cost by an estimated $3.5 million.

O'Hare Oasis (former): Reuse of the former Oasis site provides significant cost savings, taking advantage of internal roads that serve the gas stations and truck parking. In addition, I-294 is in a cut section, lower than the elevation of the station site itself. Major cost elements would include the following:

- Nearly one-half of the cost would be to construct the pedestrian bridge (Build-out and Opening Day would be the same). Since the elevation of the bridge would be the same as the previous Oasis structure that spanned I-294, with I-294 being below in a cut, there would be no need for ramps.
- Segments of the internal access roads will need to be realigned to provide space for the bus lane and platform. This accounts for 15 percent of the total costs.
- Pedestrian connections on both sides of I-294 were proposed, accounting for 14 percent of total costs. In addition to the cost of building sidewalks, this includes a short retaining wall, stairs, and ramp to access the site from the neighborhood to the east. Cost of warning devices to enable safe crossings by pedestrians through the east side truck parking area was also included.

6.8.2 Cost Sharing Opportunities

The capital costs presented above represent all costs that would be required for the stations. But many of the elements costed would involve joint use with others, who could potentially participate in funding. Other entities could include the Illinois Tollway, local community (or communities), existing property owners, private developers, or others. The basis for cost sharing would be both joint use of assets as well as entities who would benefit from the Pace investment. This latter point could involve, for example, companies whose employees could use express bus service for commuting and new development that would be more marketable with high quality transit present. Ultimately, the level of financial participation will be the result of negotiations.

Table 6-8 shows possible splits in funding for Opening Day and Build-out by station site.

Table 6-8. Station Capital Costs by Possible Funding Share (2021 $)

	103rd Street	Cermak	O'Hare Oasis	Total
PACE SHARE				
Opening Day	$33,151,000	$18,025,000	$780,000	$51,956,000
Build-Out	$40,700,000	$21,129,000	$780,000	$62,609,000
OTHERS SHARE				
Opening Day	$14,325,000	$17,463,000	$10,215,000	$42,003,000
Build-Out	$17,653,000	$20,171,000	$10,215,000	$48,039,000
TOTAL COST				
Opening Day	$47,476,000	$35,489,000	$10,995,000	$93,960,000
Build-Out	$58,352,000	$41,300,000	$10,995,000	$110,647,000

7. Implementation Plan

Steps to implement the service and infrastructure recommendations were identified, including coordination with the Illinois Tollway's Central Tri-State project and other potential Tollway-related projects, possible interchanges, and private development initiated by municipalities hosting stations. Integrating the station improvements into these other plans will be a key step towards implementation. Follow-on tasks to further the development of the stations are shown as covering funding/financing, phasing, implementing service plans, encouraging proposed private development to be supportive of transit, and design and construction.

7.1 Service and Infrastructure Recommendations

This Study culminated into two types of recommendations as shown on Figure 7-1: 1) express bus routes and 2) in-line stations. Details on both service plans and infrastructure concepts are found in the Task 2.1 *Service Plans Technical Memorandum*, and Task *2.3 Station Concepts and Capital Costs Technical Memorandum*, as well as in preceding sections of this document.

Implementation of the recommended express bus service plans will be handled internally by Pace and will involve additional refinements to the service designs (e.g., terminals, alignments, stops), integration of new routes with existing services, and a financial analysis of costs relative to available operating funds.

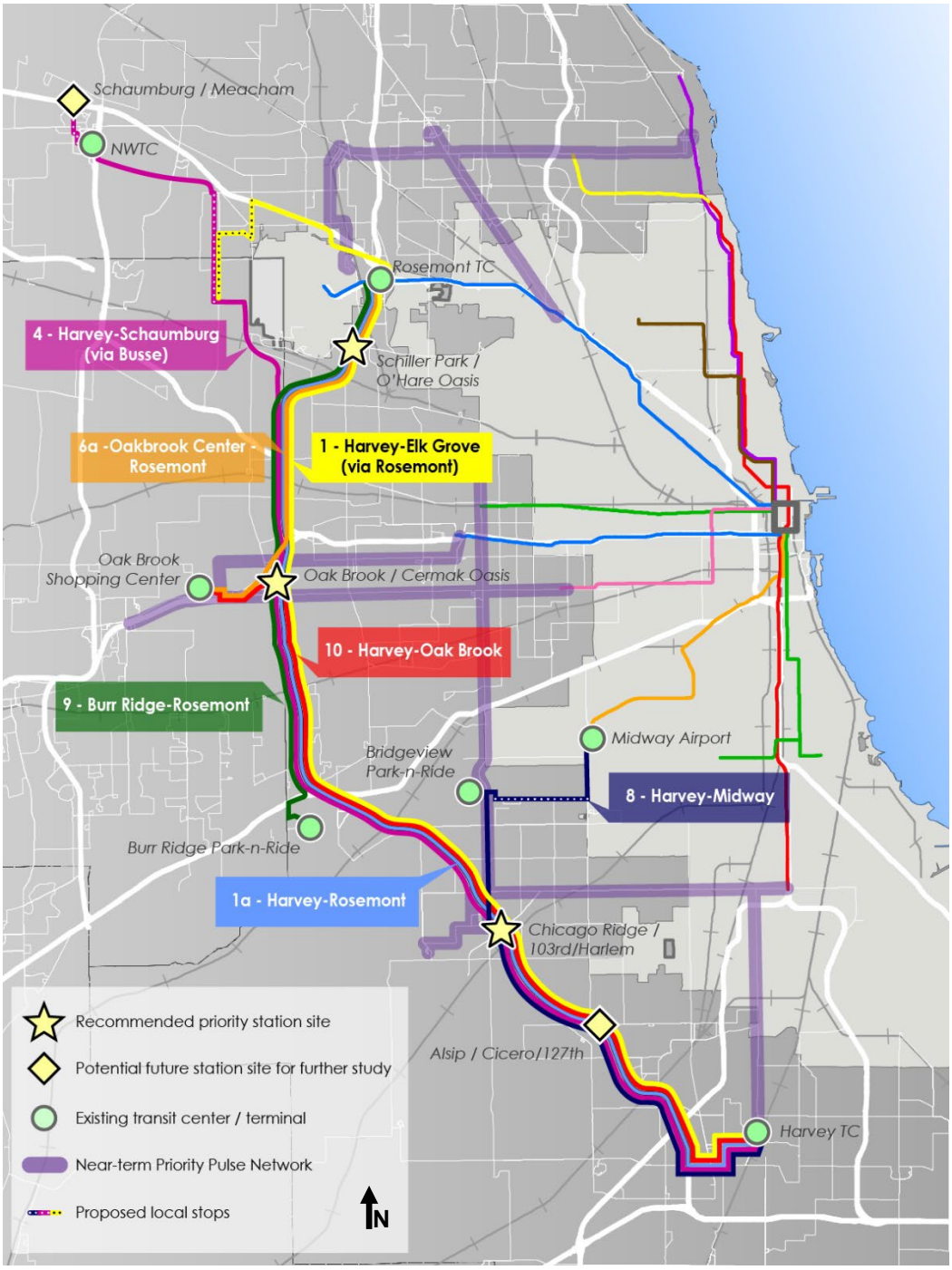
Construction of the recommended in-line station concepts will require further engineering and design work, more detailed capital cost estimating, identification of capital funding sources, procurement, design and ultimately construction. Before these activities occur, Pace will need to finalize the proposed conceptual designs, engage with local stakeholders to assess potential impacts and benefits of the proposed facilities, and develop an approach for advancing the project(s) through the design, procurement, and construction phases. Given that there are many steps that need to be completed prior to implementation, the focus of the planning-level implementation provided below focused on the immediate next steps associated with further developing the three proposed in-line stations.

The three in-line stations are described in the preceding section, and include:

- **103rd Street**: near Harlem Avenue in Chicago Ridge, the west side was previously used as a truck terminal but is largely vacant now,
- **Cermak**: north of Cermak Road in Oak Brook on the site of an Illinois Tollway Toll Plaza that is no longer used to collect cash tolls, and
- **O'Hare Oasis** (former): south of Irving Park Road in Schiller Park, site of the shuttered Oasis that spanned the travel lanes of I-294.

The Study's technical analysis also concluded that stations at I-294 and 127th/Cicero in Alsip and at I-90 and Meacham Road in Schaumburg were judged to be physically feasible and could be considered as future initiatives under their own respective timelines.

Figure 7-1. I-294 Service and Infrastructure Recommendations



7.2 Coordination Activities

The three proposed in-line station locations (i.e., 103rd Street, Cermak, and O'Hare Oasis) will require further coordination and engagement with stakeholders, notably with the Illinois Tollway and municipalities hosting stations. There are several projects and initiatives that are planned or currently underway that have the potential to affect the timing and cost of the Pace station projects.

Illinois Tollway Projects

- **Central Tri-State Tollway (I-294) Project**: The project involves widening and reconstructing the roadway and bridges, and reconfiguring interchanges between Balmoral Avenue in Rosemont and 95th Street in Oak Lawn. Currently underway, completion is expected at the end of 2026. This major construction project will reconstruct the areas identified in the Cermak and O'Hare Oasis station concepts. It is recommended that Pace explore opportunities to incorporate design and construction of certain station elements (e.g., pedestrian bridge piers in the median) while the I-294 work is in progress to capture cost efficiencies in conjunction with obtaining the necessary Illinois Tollway approvals. Resolution of this coordination will impact the implementation timeline of these two stations.
- **I-490 Tollway**: Also known as the Elgin O'Hare Western Access Project, construction continues on new interchanges that will link I-490 to the Jane Addams Memorial Tollway (I-90), the Illinois Route 390 Tollway, and I-294. The project is scheduled for completion in 2025. The by-pass around the south end of O'Hare Airport is proposed to be used by the Harvey-Schaumburg via Busse express bus route, which was one of seven routes recommended for future implementation as described in the Task 2.1 *Service Plans Technical Memorandum*.

Other Initiatives

- **103rd Street Redevelopment**: Plans are underway to raze and redevelop a trucking terminal at 10301 South Harlem Avenue in the Village of Chicago Ridge. The 75-acre property lies within a 105-acre Tax Increment Financing (TIF) District stretching along Harlem Avenue. The Village's goal is to attract mixed-use development for the property.

  The TIF District is based on an element of the Village's Comprehensive Plan: *Harlem Triangle Subarea Plan*, Village of Chicago Ridge, May 2012 (Comprehensive Plan) and the *Harlem Avenue and 103rd Street Redevelopment Plan and Project*, Village of Chicago Ridge, September 2014 (Harlem Avenue TIF Plan).
- **103rd Street Interchange**: The Illinois Tollway and the CCDOTH studied a possible I-294 interchange at 103rd Street (*Interchange Impact Study, 103rd Street/Southwest Highway & Pulaski Road/Midlothian Turnpike*, Illinois Tollway and CCDOTH, 2019). This improvement is no longer being actively considered; however, should an interchange be pursued in the future, it could render an in-line station at this location infeasible.
- **Cermak Reuse of Toll Collection Lane Area**: The Illinois Tollway's decision to convert to all-electronic tolling freed up ROW at the Toll Plaza for other uses. As a part of this transition, the parallel C-D road ramps between Cermak and Roosevelt Roads will require realignment. Since the C-D roads would be used by Pace express buses, the timing of these improvements will impact the development timetable for the station. Additionally, the design of the station's exit and entry ramps will need to be coordinated with the Illinois Tollway's design.

  The placement of the in-line station improvements sought to maximize the footprint of the cash toll lane area for other future Illinois Tollway uses. As the type of uses are defined, it is recommended that Pace explore where possible synergies lie to achieve an efficient design that meets the goals of each respective project. This may include coordinating the use of available ROW, as well as potential travel markets for the express bus service relative to Illinois Tollway designated future land uses.
- **O'Hare Oasis (former) Redevelopment**: The O'Hare Oasis encompassed over ten Village of Schiller Park business establishments prior to its removal in 2019. The Village hopes to restore the lost sales tax revenues by redeveloping portions of the site. The status of redevelopment plans is unknown at this time, but future redevelopment would

ideally include transit-supportive land uses and design elements to reinforce the demand for Pace express bus service. The potential for shared use of assets, such as parking, should be explored. Also, the owners of the gas station facilities on both sides of I-294 will need to review and approve adjacent development that is proposed.

- **O'Hare Oasis (former) Potential Interchange**: Currently, I-294 access at Irving Park Road is limited to travel to/from the north only. In response to the Village of Schiller Park's request, the Illinois Tollway conducted the *Central Tri-State Tollway at Irving Park Road Feasibility Study* to develop concepts for additional I-294 access to the area. Proposed interchange ramps could be placed on either the Oasis site or to the north at Irving Park Road. Based on preliminary drawings from the study, a station would be feasible should new ramps be constructed at the former O'Hare Oasis or at Irving Park Road. However, the design for how the station is configured will be determined by the presence of a new interchange. Currently, the Village is seeking a grant to advance the interchange concept by initiating engineering design.

7.3 Funding and Financing

Preliminary costs to complete design and construct the three in-line stations based on the high-level conceptual layouts could be in excess of $100 million. I-294 in-line stations and park-n-ride facilities are included in Pace's 2021-2025 Five-Year Capital Plan (*Pace Suburban Service & Regional ADA Paratransit Budget*, Pace, November 2020). Pace has tentatively identified $35 million in Rebuild Illinois funds that could potentially be used to fund project development work on any or all of the three in-line stations, including design engineering and/or construction.

The three I-294 station improvements could potentially qualify for the designation of a regionally significant project (RSP). As a constrained RSP, this would be a priority in CMAP's ON TO 2050 long range plan; unconstrained RSPs would be recommended for further study. Constrained projects would be eligible to receive federal transportation funds and obtain certain federal approvals. It would appear that the package of three in-line stations could qualify for the RSP designation, that is, cost at least $100 million and operate on shared rights of way where transit has priority over other traffic.

Regardless of how the stations are packaged and the outcome of the RSP designation, additional funding could be required beyond the Rebuild Illinois funds. There are a number of potential funding and financing sources that could be considered to augment these anticipated State capital funds as described below.

7.3.1 Capital Grants

- **Federal Transit Administration (FTA) Capital Investment Grants Program (CIG)**: The FTA's CIG program is intended to fund major new or extended fixed-guideway or bus rapid transit (BRT) projects. A quick assessment of eligibility suggests that the three station projects would not qualify.
- **Rebuilding American Infrastructure with Sustainability and Equity**: The RAISE grant program is administered through the US Department of Transportation (DOT) and was formerly known as BUILD and TIGER. This competitive program is intended to invest in road, rail, transit, and port projects that will achieve national objectives. This may be a funding program to consider, although the highly competitive nature of the grant process makes it less viable.
- **Congestion Mitigation and Air Quality Improvement (CMAQ)**: The CMAQ program funds surface transportation projects designed to improve air quality and mitigate congestion. CMAP administers the program. Both federal guidance and the CMAQ Project Selection Committee give priority to projects that reduce emissions.

- **Surface Transportation Program**: STP provides federal flexible funding to localities for projects to preserve and improve the conditions and performance of transportation projects, including transit capital projects. Funds are programmed locally and administered through CMAP and the Illinois Department of Transportation (IDOT).
- **Innovation, Coordination, and Enhancement**: The RTA ICE program provides funding to enhance the coordination and integration of public transportation. Projects are intended to result in reliable and convenient transit service and enhance efficiencies through effective management, innovation, and technology. The Program is funded at approximately $10 million per year and distributed to the three service boards at set percentages. Pace's share is 13 percent, or about $1.3 million per year.
- **Invest in Cook**: The CCDOTH Invest in Cook Program funds planning and feasibility studies, engineering, right-of-way acquisition, and construction associated with transportation improvements sponsored by local and regional governments and private partners.

7.3.2 Financing

- **Tax Increment Financing**: TIF districts are a common form of value capture. A TIF district with specific geographic boundaries is created for a specific time period—for example, 23 years. Over this time period, the property tax revenue from the increase (or "increment") in assessed value from the base year is set aside in a separate fund which can only be used to pay for or finance improvements within the TIF district. The growth in assessed real estate value is typically attributed to public investment in the area, such as the construction of a major piece of infrastructure like a transit station, which nearby private landowners benefit from when their property values increase.

  Improvements on the west side of I-294 for the 103rd Street station are included in the Chicago Ridge 103rd / Harlem District. The former O'Hare Oasis site is not currently covered by a TIF district, although the Schiller Park West Gateway 2 District, immediately north and west of the site, includes pedestrian links to the proposed station.
- **Joint Development**: Joint development can take many forms, but generally covers the integrated development of transit and non-transit improvements. A common form is the construction of a transit station coordinated with the development of a physically adjacent and supporting commercial, residential, or mixed-use project. This may be accomplished using a public-private partnership and is predicated on sharing both the risks and rewards across the public and private partners. Terms of the joint development are negotiated on a case-by-case basis, including items such as ownership or lease terms, as well as the divisions of rights and responsibilities among parties.

  Joint development could provide cost-sharing opportunities at the 103rd Street and former Oasis sites as private developer plans evolve. This could include cost sharing of jointly-used assets such as roads, sidewalks, and parking. Potential opportunities may also exist at the Cermak site, depending on how the Illinois Tollway intends to repurpose the cash tolling areas in the future. Opportunities for sharing the costs of operating and maintaining the jointly-used assets should also be explored; providing these services locally can be more efficient than for a regional agency such as Pace.
- **Transportation Infrastructure Finance and Innovation Act**: TIFIA provides credit assistance for large-scale, surface transportation projects. An eligible project must be included in the applicable State Transportation Improvement Program and include a capital cost of at least $50 million.

7.3.3 Cost-Sharing Opportunities

Some station-related improvements within the I-294 ROW may also be beneficial to the Illinois Tollway. As such, certain project elements present opportunities for cost-sharing with the Illinois

Tollway as well as adjacent municipalities. Based on the conceptual designs for the three stations, examples of infrastructure elements that may be of mutual interest to Pace, the Illinois Tollway, and adjacent municipalities may include the following:

- Pedestrian bridges that can be available both to the general public and express bus riders would improve multimodal mobility and access, making the walking environment more usable. Pedestrian improvements may also attract investment from municipalities interested in improving nonmotorized connectivity.
- The Illinois Tollway has previously committed to constructing a pedestrian bridge to replace the function that the O'Hare Oasis provided to cross I-294 on foot. The argument can also be made that connections to the area sidewalk network would need to be part of this investment. This connectively would include a retaining wall, ramp, and stairs to connect to Seymour Avenue on the east, as well as the warning devices to permit safe pedestrian passage through the truck parking area.
- The Illinois Tollway's realignment of C-D ramps, barrier walls, and shoulders at Cermak will be integral to the express bus exit/entry ramps.
- The development of an access roadway on the east side of the Cermak station site using the Queen of Heaven Catholic Cemetery property should be carefully evaluated by Pace and the Illinois Tollway. Accommodating the proposed access road would also include constructing a turn lane and signal modifications to Cermak Road. Currently, the primary access to Illinois Tollway facilities on the east side of I-294 are limited to two access points within the northbound cash tolling area. Southbound vehicles must reverse direction at an interchange to reach the northbound-only access to the Toll Plaza site. Providing direct access from Cermak Road could also be advantageous for a future user of the freed-up cash tolling ROW.

It should be noted that Illinois Tollway cost participation opportunities may be limited to new or improved interchange locations proposed by local governments. These agreements follow the policy set forth in the *Interchange and Roadway Cost Sharing Policy*, Illinois Tollway, 2012.

7.4 Project Phasing

Developing a detailed timeline with specific activities is, at this time, limited by the uncertainty of the plans (e.g., project scope, timeline, priority) of others. Determining how the stations may be augmented by or integrated into the projects of others will inform how to evolve station designs, costs, timing, and even procurement approach(s). As emphasized below, gaining a solid understanding of these projects and initiatives will be a key step in defining a path forward to implementing the recommended in-line stations. The following provide suggested steps in completing the Project Development phase, and lists follow-on tasks for implementation, but with less detail.

7.4.1 Project Development

An immediate next step to this Study will be to coordinate with stakeholders (i.e., Illinois Tollway, Cook County, DuPage County, municipalities hosting stations, developers) who are or may be advancing plans at the station sites. As the plans of others become better defined, integrating the station concepts into the larger station area will be completed. Pace may consider developing a thorough timeline of both internal and external coordination activities identifying which stakeholders to engage, how to engage them, and when. Topics for discussion may cover the following, among others:

- Confirm stakeholder support of station concepts.
- Identify station assets that can be shared (e.g., roads, sidewalks, parking) and gauge funding participation.

- Pace may consider developing collateral materials to support how components of the station's infrastructure would provide value to others, including cost-sharing examples elsewhere in the region.
- Encourage municipalities to promote transit-supportive land uses and apply design concepts that support high quality transit service. RTA and Pace could lead visioning and corridor development planning to foster these considerations.
- Gather general parameters on the anticipated timing emerging for future projects and initiatives.

Based on these discussions, adjustments to the conceptual layouts and preliminary estimated capital costs will need to be made. In response to the feedback provided on timing, identify procurement approaches to achieve project implementation efficiencies. For example, this may include non-traditional delivery approaches or may include different permutations related to packaging of the projects (e.g., three standalone projects, one combined project, or combinations of one and two station packages).

Other near-term steps to advance the project(s) are:

- Develop a project development plan to serve as a roadmap for executing the project through all phases of planning, design, procurement, and construction. This would include identifying what activities would be done in-house and what would be contracted, a funding/financing plan for how the project will be funded, and other critical elements necessary to advance the project.
- The service plans, which were envisioned as a menu of possibilities for Pace to consider, should be reviewed and priorities established. The results of the STOPS modeling can be a source for this prioritization, although other factors should also be used. Impediments to implementation should be identified; for example, Harvey-Schaumburg via Elk Grove requires completion of I-490. The number of vehicles to support the services identified in the Task 2.1 *Service Plans Technical Memorandum* should be confirmed, including spares. Steps to procure vehicles should be determined, which would be a separate process from the construction procurement. The anticipated garage(s) that would be used to support each route should be identified, and the possible need for increasing capacity assessed. Finally, Pace service planning staff should begin to evaluate how the introduction of any of the proposed services will impact current service. Ideally, this work will occur post-pandemic, and available current route ridership data will represent "normal" conditions.
- Upon completion of discussions and coordination with local stakeholders, initiate the land acquisition process for the 103rd Street and Cermak projects. It is anticipated that this process would involve reaching out to CenterPoint Properties to explore ways to provide vehicle and pedestrian access to the southbound platform at Cermak. Also engage the Queen of Heaven Catholic Cemetery on acquisition of a strip of ROW for the proposed access drive to Cermak Road on the east side of I-294.

7.4.2 Initial Phasing Recommendations

Based on information known to date and pending further discussions with stakeholders and partner agencies, the initial recommended implementation plan prioritizes advancing the Cermak and O'Hare Oasis (former) station locations. Details on sequencing these projects from a funding (e.g., cash flow), procurement, and staffing capacity perspective will need to be further assessed. The order of station implementation for the five locations is preliminarily recommended as follows:

1. **Build Cermak and O'Hare Oasis (former) Station Locations**: These projects are ripe for implementation based on the following points:

- Both locations are within the Central Tri-State project area, which is already underway and includes Flex Lanes as part of its design and construction. As such, there exists a high level of certainty in how the design of stations can fit within the I-294 ROW. Overall, implementation of the Central Tri-State project presents an opportunity to accelerate the Cermak and O'Hare Oasis station development and capitalize on the benefits that the Flex Lanes impart.
- Both locations can generally be accommodated within existing footprints given that the respective I-294 ROW that they would use is transitioning from other uses (i.e., Cermak Toll Plaza and O'Hare Oasis). The available ROW that will become available as a result of these transitions results in comparatively less land to acquire (which equate to time and cost) and will require a relatively straightforward coordination approach with other entities.
- Pace's allocation of Rebuild Illinois funding is a viable funding source for both locations. Depending on the final design and construction costs (inclusive of any potential cost-sharing agreements and other partnerships), there may even be an opportunity to support additional projects in this corridor.
- Constructing these two stations would be a quick way to expand access to new service in the corridor and tap into part of the latent travel market.
- Given the readiness of these locations (e.g., few constraints related to planning, funding, environmental, and design), these stations require a comparatively shorter timeframe to advance toward implementation relative to other locations.

2. **Continue Planning Activities to Support Future Implementation of the 103rd Street Station**: While this station location shows much promise, more planning and consultation and coordination with Pace partners will be necessary to further advance this project through the development process. This recommendation is based on the following points:
    - Consultation and coordination with property owner(s), the Village of Chicago Ridge, and Cook County is needed to confirm that area redevelopment plans or a potential interchange would not preclude an in-line station from being constructed as conceptually designed or from being built all together.
    - Given uncertain redevelopment plans, more time is required to coordinate the placement of infrastructure and how it will interact (i.e., help or hinder) private redevelopment at the site.
    - A funding source and potential financing tool would need to be identified to advance the project through environmental, design, and construction.
    - Since this site is south of the Central Tri-State project limits, it will be important to determine whether similar roadway improvements, and specifically Flex Lanes, will be part of a future I-294 phase (and when). This will help to minimize or eliminate the need to rebuild components of the station. For example, if the Illinois Tollway is contemplating a future roadway widening south of the Central Tri-State project limits, bus exit/entry lanes would ideally be constructed at the same time, not before, to avoid rebuilding the transit investment. Constructing the transit improvements concurrent with the roadway improvements would also open the potential for more cost-sharing opportunities.
3. **Plan for I-90 / Meacham and 127th / Cicero**: Pace should continue to work with stakeholders/partners on these two possible in-line stations. Should the Cermak and O'Hare Oasis stations prove successful, having additional opportunities to expand this model already identified would be advantageous to the agency, especially if the fiscal landscape changes. It's also worth noting that planning for transit infrastructure at the Meacham Road site on I-90 is in process, led by the Village of Schaumburg.

7.4.3 Implementation Process

Implementation of the station projects is assumed to generally follow a multi-phased process for planning and building highway improvements. The number of steps and the timeframe to complete varies by the complexity and jurisdictions impacted. As the key questions raised above are resolved, a more definitive implementation process can be prepared.

Phase I Design and Environmental Review: The Phase I Engineering report will cover:

- Introduction / project description
- Purpose & Need
- Existing Conditions
- Stakeholder Coordination and Outreach, including additional ongoing corridor development and associated planning activities carried through the multi-step process
- Engineering Studies - Topographic surveys as well as other engineering studies (e.g., traffic study, structural integrity evaluations, stormwater management study).
- Phase I design plans - Improvements within I-294 ROW would follow Illinois Tollway's Standards and Manual criteria. Plans will also require approval by the Illinois Tollway.
- ROW needs
- Utilities - Document public and private utilities that would be impacted by the project.

While it is believed that the station projects will not be required to comply with the National Environmental Policy Act (NEPA) this should be confirmed. Should this be a requirement, it is assumed that the level of analysis to be performed will be a documented Categorical Exclusion (CE), although Pace would need to consult and coordinate with the applicable federal sponsoring agency to confirm the NEPA class of action.

Phase II Design: The final design of the station will be completed, including final engineer's estimated costs. Elements of the Phase II work will include:

- Prepare a job site construction plan and develop construction material requirements used to prepare the final contract to be bid on by contractors pre-qualified by the Illinois Tollway.
- Complete contract plans, conduct geotechnical investigation, and complete all bridge and pavement reconstruction reports.
- Conduct land surveys, appraise property, and complete negotiation with landowners to acquire needed land.
- Identify utilities that are impacted by the project and prepare utility agreements with local agencies or private entities.
- Prepare agreements with local agencies.
- Complete Phase II engineering.

Phase III Construction: Through coordination with the Illinois Tollway, confirm cost-participation and constructing agency responsibilities (i.e., Illinois Tollway or Pace). Contract plan preparation and advertisements would be coordinated between the two agencies and potentially IDOT where local access is required. Plans and specifications would need to be prepared according to Illinois Tollway Standards and Manual criteria; contractors would need to be pre-qualified by the Illinois Tollway. Further discussions would be required to confirm whether the letting agency would be the Illinois Tollway.

8. Stakeholder and Public Outreach

To date, outreach activities to communicate the development of Pace's project along the I-294 Tri-State corridor include the following:

- Internal Pace and RTA coordination
- Coordination with external entities
- Public input using an online survey

Pace will continue to engage with external stakeholders as conceptual plans progress into more advanced design work in the coming years, and publish updates on the project webpage.

8.1 Internal Coordination

Bi-weekly Coordination calls: Starting in February 2020, bi-weekly virtual meetings were held with RTA and Pace staff and the Project Team. Each call was guided by a PowerPoint presentation that covered action items from the previous call and new project content for discussion. Notes and a list of action items were prepared following each call.

Internal Staff Workshops:

- September 2020, a workshop was convened with Pace service planners and other Pace staff to brainstorm service scenarios as input to the Study.
- April 2021, a meeting with RTA and Pace managers and community engagement staff held to review preliminary Study recommendations and finalize stakeholder and public outreach.

8.2 External Coordination

Illinois Tollway Meetings: Two meeting were held with Illinois Tollway staff,

- June 2020, to obtain information on Tollway's I-294 improvement plans and concepts to be explored were brainstormed.
- April 2020, to obtain reactions to preliminary Study recommendations.

Regional Agency Review: The technical memoranda on service and infrastructure plans were sent to the Illinois Tollway, Chicago Transit Authority, Metra, CMAP, Cook County, and DuPage County on May 21, 2021.

8.3 Public Outreach

After the Study concluded, Pace developed and conducted a public survey in early 2022 which polled respondents on the draft recommendations.

About the survey:

- The electronic survey was hosted on Pace's website and included links to an earlier version of this report and other study deliverables.
- 138 responses were collected between February 3rd and March 7th, 2022.
- The survey was promoted via email subscriber list, social media posts, website updates, local government partners along the corridor alerted and requested to share the link, a joint RTA-Pace press release, Pace board meeting updates, and local media coverage.

Summary of Responses:

- Need for service: 80 percent of respondents agreed or strongly agreed that there is a need for high-speed Pace Express bus services along I-294, and that Pace should invest in new infrastructure and services to utilize new Flex Lanes.
- Service issues: Connections to other transit services (CTA, Metra, and other Pace), all-day service in both directions, and connections to jobs were the most important issues for improving bus service in the corridor.
- Favored routes: Of the seven concepts proposed, the "Harvey-Schaumburg via Elk Grove" and "Harvey-Midway" routes ranked most important, with "Harvey-Rosemont" and "Oak Brook-Rosemont" ranked nearly as important. While "Harvey-Oak Brook" and "Burr Ridge-Rosemont" ranked as the least important, all seven concepts had a decent showing of support overall.
- Station design considerations: The most important were those that provide transfer opportunities, faster speed/reduced travel time, and sidewalk connections.
- Favored stations: Among the three proposed for development, "O'Hare Oasis" was the slight favorite at 76%, with Cermak and 103rd Street tied at 70% (respondents were able to select multiple choices, thus percentages add to more than 100).

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