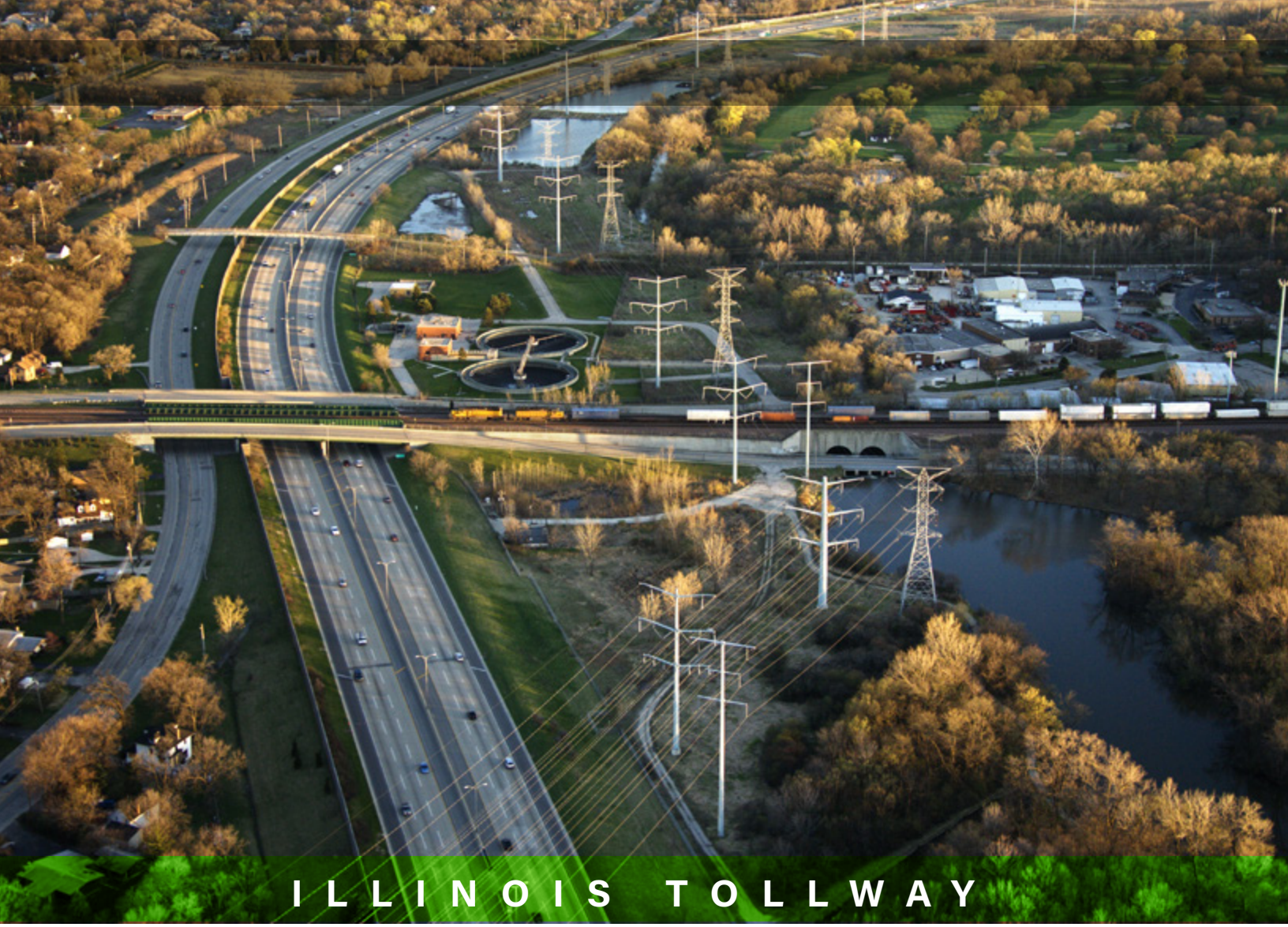
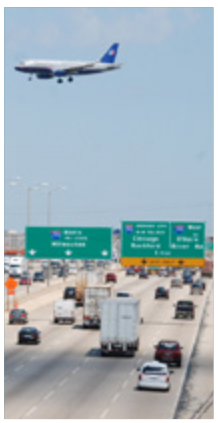


ILLINOIS TOLLWAY

Comprehensive Traffic and Toll Revenue Study

November 22, 2021





Prepared for:
ILLINOIS STATE TOLL HIGHWAY AUTHORITY

By:
CDM Smith
November 22, 2021

Table of Contents

List of Figures

List of Tables

Appendices

This page intentionally left blank.

Chapter 1
Background

1.1 Introduction

The Illinois Tollway operates a system of toll facilities in northern Illinois, primarily within the Chicago metropolitan area and the surrounding counties. The system currently includes 294 centerline miles of limited-access highways across five routes. Four of the five routes are part of the national Interstate Highway System, while the fifth, Illinois Route 390 (IL 390), is an Illinois state route built to interstate standards.

The Illinois Tollway was created by the Illinois General Assembly in 1953 to provide for the construction, operation, regulation, and maintenance of a system of toll highways within the state of Illinois. Opened in September 1958, the first Illinois Tollway routes were financed through the sale of revenue bonds. Bond debt payments, as well as ongoing maintenance and operating costs, are funded through the collection of tolls paid by roadway users. The system has expanded dramatically over the years to keep pace with increasing traffic demand and regional development and growth. The Illinois Tollway system is self-supporting and does not receive federal or state funding.

1.2 Report Overview

The report presents the findings of the Comprehensive Traffic and Toll Revenue Study, and it is intended to support the issuance of new toll revenue bonds. This report provides potential investors and the financial community with a comprehensive overview of the Illinois Tollway system's position within the regional transportation network. It also provides operating characteristics, past revenue trends, and the methodologies used to develop future traffic and toll revenue forecasts. The forecast contained herein includes annual transactions and toll revenues at the systemwide and facility levels through 2050.

- **Chapter 2** focuses on past and current operating characteristics of the Illinois Tollway, including growth in traffic volume over time, toll revenue trends, and participation in the Tollway's electronic toll collection (ETC) system, known as I-PASS. This chapter provides additional information regarding typical travel speeds, both on and off the Tollway system. Chapter 2 offers a profile of Tollway patrons and their various trip characteristics.
- **Chapter 3** provides an analysis of demographic and economic conditions within the Illinois Tollway service area. This chapter explores historical development patterns and highlights current socioeconomic characteristics of the service area.
- **Chapter 4** documents the methodology used to develop traffic and revenue forecasts, as well as the processes used for travel demand forecasting, model development, and model calibration. The chapter also identifies and provides the rationale behind the use of key variables used in the travel demand model.

- **Chapter 5** summarizes traffic and toll revenue forecasts for 2021 through 2050 for the existing Illinois Tollway system. It outlines basic assumptions, toll rate assumptions, and key inputs to the forecasting process, including specific projects that make up the Move Illinois capital program. Chapter 5 identifies specific one-time events, such as a facility expansion or improvement, planned construction efforts, and other events that may materially impact traffic and toll revenue.
- **Chapter 6** documents the sensitivity tests performed by CDM Smith, which entail the alteration of key assumptions, such as regional socioeconomic growth, the assumed value of time, and the cost of motor fuel. Results of the sensitivity tests provide insight into the degree to which each of the tested variables has an impact on the system.

The COVID-19 pandemic, and the widespread social distancing measures adopted by state and local governments, along with private-sector organizations, greatly impacted travel behavior beginning in March 2020. These impacts continue, although at a reduced level, through the time of publication of this report. Section 2.2.2 of the report describes the impacts of the COVID-19 pandemic on the Illinois Tollway system in detail. As a result of the unprecedented impact of the pandemic on travel behavior, some of the data points in the description of recent performance of the Illinois Tollway system rely on 2019 data, rather than 2020 data, to better illustrate typical conditions.

The remainder of this chapter presents an overview of the geographic region in which the Tollway system is situated, as well as a general description of the individual facilities that constitute the Tollway system. It concludes with a discussion of the toll collection methods used on the Illinois Tollway, as well as the past and current toll rate structure.

1.3 Illinois Tollway Service Area

Illinois Tollway facilities pass through 11 counties in northern Illinois, as illustrated in Figure 1-1. For the purpose of this report, the majority of the system's trips are generated from the local service area that comprises Cook, Boone, DeKalb, DuPage, Kane, Lake, Lee, McHenry, Ogle, Will, and Winnebago Counties.

The geographical location of the Chicago metropolitan region, in relation to the rest of the country, significantly influenced population settlement and commercial development patterns in the area. Lake Michigan provides a barrier to ground transportation between the northeastern and western United States, requiring any ground transportation route to pass south of Lake Michigan through the Chicago metropolitan region. This location significantly contributed to Chicago's status as a major railroad hub and the dominant urban area in the Midwestern United States. These same traits cemented Chicago's status as a strategic hub for regional and interstate highway travel as motor vehicles became the dominant mode of commercial transport.

Figure 1-1. Illinois Tollway Service Area

The Illinois Tollway originally was constructed to provide efficient interstate travel between Wisconsin, Illinois, and Indiana, and to complement the expressway network built to serve the Chicago area. The Tri-State Tollway (Interstate 94 [I-94]/I-294/I-80), the Jane Addams Memorial Tollway (I-90), and the portion of the Reagan Memorial Tollway (I-88) east of Aurora opened for traffic in 1958. The western portion of I-88 opened in 1974. The original portion of the Veterans Memorial Tollway (I-355) from I-55 to Army Trail Road opened in late 1989. The I-355 south extension between I-55 to I-80 opened in late 2007. The Illinois Route 390 Tollway (IL 390 Tollway) opened in phases between 2016 and 2017, and it will connect to the future I-490 Tollway at its eastern terminus. I-490 is anticipated to open to traffic in 2026 and link I-90 to the north and I-294 to the south.

At the opening of the three original facilities in 1958, the Chicago metropolitan area had a population of more than 6.5 million. Much of the region's employment at that time was concentrated within the city of Chicago, and the downtown area was one of the largest employment centers in the country. Following national trends, Chicago's suburbs developed rapidly between the 1950s and 1970s. This rapid residential development of suburban northeastern Illinois resulted in much of the Illinois Tollway becoming prime commuter routes to employment centers in Chicago and surrounding Cook County. As employment increased in the suburban areas—particularly in Lake, DuPage, and northwest Cook Counties—travel patterns evolved on the Tollway system. Suburban-to-suburban commutes became more common, further contributing to traffic growth. In response to this trend, interchanges were added throughout the urbanized area, and in 1989, I-355 was constructed to serve the growing suburban-to-suburban commuter market. Today, the five Illinois Tollway facilities serve more than 8.8 million residents within the 11 counties directly touched by the system.

While passenger car traffic constitutes the majority of transactions, the Illinois Tollway continues to serve a vital role in interstate commerce. In 2019, a record 122.4 million commercial vehicle (CV) transactions occurred on the Illinois Tollway. CVs accounted for 12.0 percent of systemwide transactions and 47.4 percent of the Tollway's revenues in 2019, up from 34.9 percent of revenues in 2014.

The Tri-State Tollway accounts for more than half of all CV transactions and revenues on the Illinois Tollway. Overall, the Tri-State Tollway represents nearly half of the system's total revenue. This route is vital to regional commerce, allowing for the efficient transfer of materials between Wisconsin, Indiana, and Illinois. The route is adjacent to Chicago O'Hare International Airport, several intermodal rail facilities, and numerous manufacturing and warehousing facilities. The Tri-State Tollway also provides connections to the following interstate routes: I-55, I-57, I-80, I-90, and I-94. The southernmost five miles of I-294 are co-signed with I-80, a national truck route. The 163rd Street Toll Plaza, just north of the junction with I-80, has the highest number of 5-axle truck transactions on the entire Tollway system. Large, 5-axle trucks also account for a significant portion of total transactions at this plaza—18.0 percent—compared with 8.3 percent of transactions systemwide.

The Jane Addams Memorial Tollway is part of the overall I-90 route, which extends 3,100 miles from Boston to Seattle, serving a vital link in long-haul national commerce. The IL 390 Tollway serves industrial land uses on both its eastern and western segments, and the eastern segment provides direct access to one of the region's largest industrial clusters located to the west of Chicago O'Hare International Airport. The remaining two routes, I-88 and I-355, provide similarly important roles to regional and interstate commerce.

1.4 Illinois Tollway Routes

The Illinois Tollway system comprises five routes: Jane Addams Memorial (I-90), Tri-State (I-94/I-294/I-80), Reagan Memorial (I-88), Veterans Memorial (I-355), and IL 390 Tollways. A sixth route, the I-490 Tollway, is currently under construction (Figure 1-2).

The following section presents a general description of the physical attributes and location of each of the five Illinois Tollway routes. It also provides an overview of the demographic and socioeconomic makeup of the areas they serve.

1.4.1 Jane Addams Memorial Tollway (I-90)

The Jane Addams Memorial Tollway, designated I-90 for its entire length, runs in a generally east-west alignment from just east of the Chicago O'Hare International Airport, through Rockford, Illinois, to the Wisconsin border. As illustrated in Figure 1-3, I-90 passes through portions of Cook, Kane, McHenry, Boone, and Winnebago Counties.

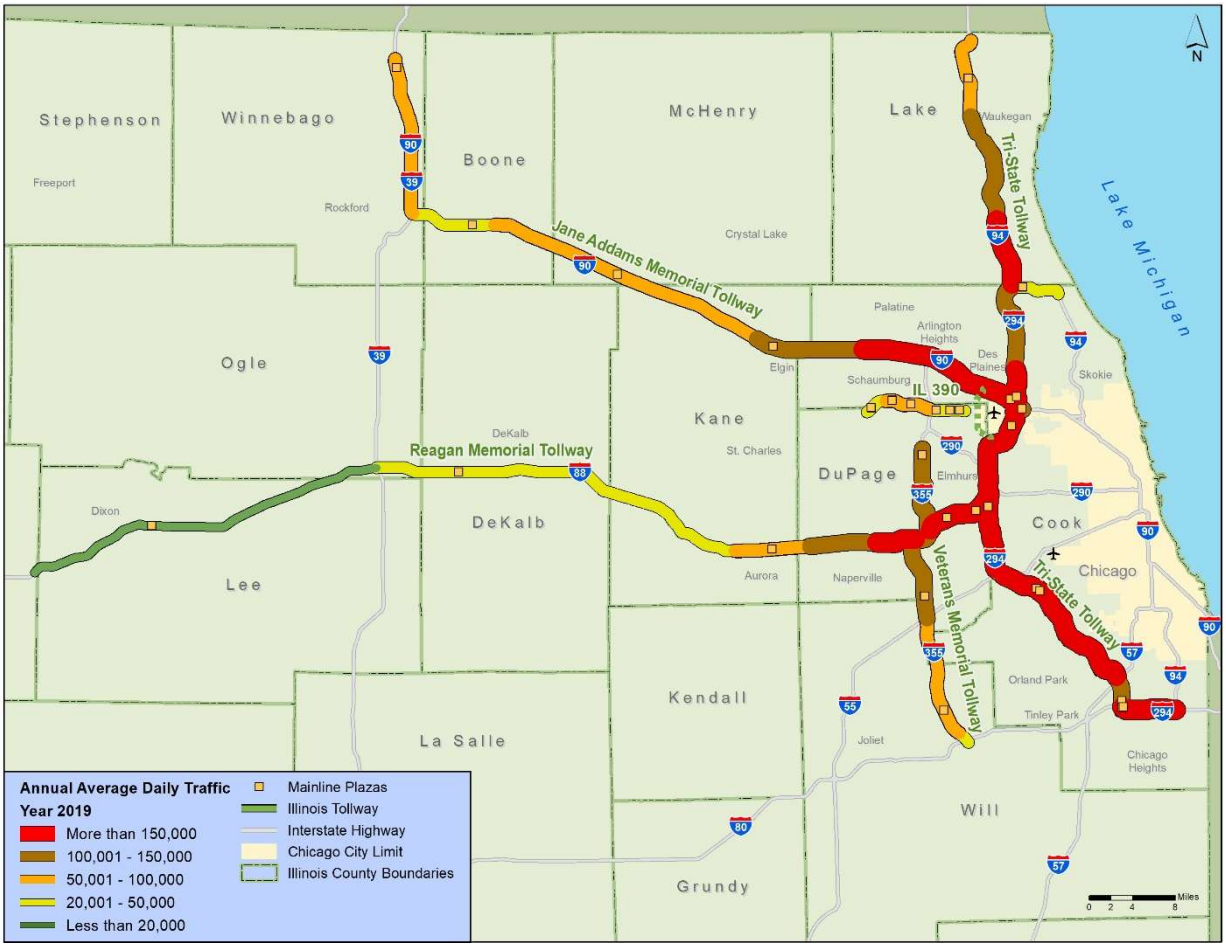


Figure 1-2. Tollway routes and their recent average daily traffic (ADT) volumes

At its northernmost extent, the Illinois Tollway jurisdiction on I-90 ends at Rockton Road, 1.2 miles south of the Illinois–Wisconsin state border. The Tollway's jurisdiction ends just east of Chicago O'Hare International Airport, from which I-90 continues as the Kennedy Expressway, providing a direct route to the northwest side of Chicago and the Chicago central business district. The Jane Addams Memorial Tollway is part of the national I-90 corridor linking the East and West Coasts, and it provides regional access between northwest Indiana and central Wisconsin. Between 2013 and 2016, the entire I-90 corridor was reconstructed and widened, adding more than 120 lane miles to the Tollway system. The route now provides a six-lane cross section from Rockford to Elgin and an eight-lane cross section from Elgin to the Tri-State Tollway (I-294). There are a total of six mainline plazas (South Beloit, Belvidere, Marengo-Hampshire, Elgin, Devon Avenue, and River Road), and 16 ramp plazas, along the Jane Addams Memorial Tollway.

The 16 easternmost miles of I-90, between Barrington Road and the Kennedy Expressway, host the Tollway's first active traffic management corridor, or SmartRoad. Along this corridor, overhead gantries provide lane-specific information on incidents and lane closures, as well as other critical information such as travel times.

Figure 1-3. Jane Addams Memorial Tollway Location Map

The easternmost segment of I-90 is located in northwest Cook County, a densely developed urban area that has experienced sustained population and employment growth since the 1950s. Elgin, located in Cook and Kane Counties, is home to approximately 113,000 residents. Nearby Arlington Heights (76,000 residents) and Schaumburg (75,000 residents) have large populations, and other suburbs along I-90, including Des Plaines, Hoffman Estates, and Mount Prospect have populations of more than 50,000 residents. Chicago O'Hare International Airport, the sixth busiest airport in the world by total passenger traffic and the busiest airport in the world by number of aircraft movements[1], and the nearby communities of Elk Grove Village and Rosemont, are major employment centers. Office and other commercial development are prevalent throughout this corridor. Woodfield Mall and other nearby facilities in Schaumburg serve as major regional retail centers. Northwest Cook County is expected to continue to grow in the future, though at a slower pace because of the diminishing availability of developable land.

The western section of I-90 connects northwest Cook County to the Rockford metropolitan area, passing through low-density suburban and rural areas. While lower in density than Cook County, Kane and McHenry Counties are among the fastest growing in Illinois, as development continues to spread westward out from the Chicago area. Rockford is the largest city in Illinois outside the Chicago metropolitan area, with a population of about 145,000 residents.

[1] Data presented are according to the 2019 list of world's busiest airports, issued by the Airports Council International in May 2020.

1.4.2 Tri-State Tollway (I-94/I-294/I-80)

The Tri-State Tollway is illustrated in Figure 1-4. The southern 53 miles are designated I-294, and the northern 25 miles are designated I-94. The southernmost five miles are concurrent with I-80. Between 2006 and 2009, more than 105 lane miles were added to the Tri-State Tollway as large portions were reconstructed and widened. The route now provides an eight-lane cross section along its entire length. Only the Central Tri-State Tollway (I-294), which was already eight lanes wide from 95th Street to Balmoral Avenue, was not widened during this time frame. Reconstruction and additional widening work began on this central section in 2018 and is planned for substantial completion in 2026. There are a total of eight mainline toll plazas (Waukegan, Edens Spur, Touhy Avenue, Irving Park Road, Cermak Road, 82nd Street, 83rd Street, and 163rd Street), and 17 ramp plazas, along the Tri-State Tollway.

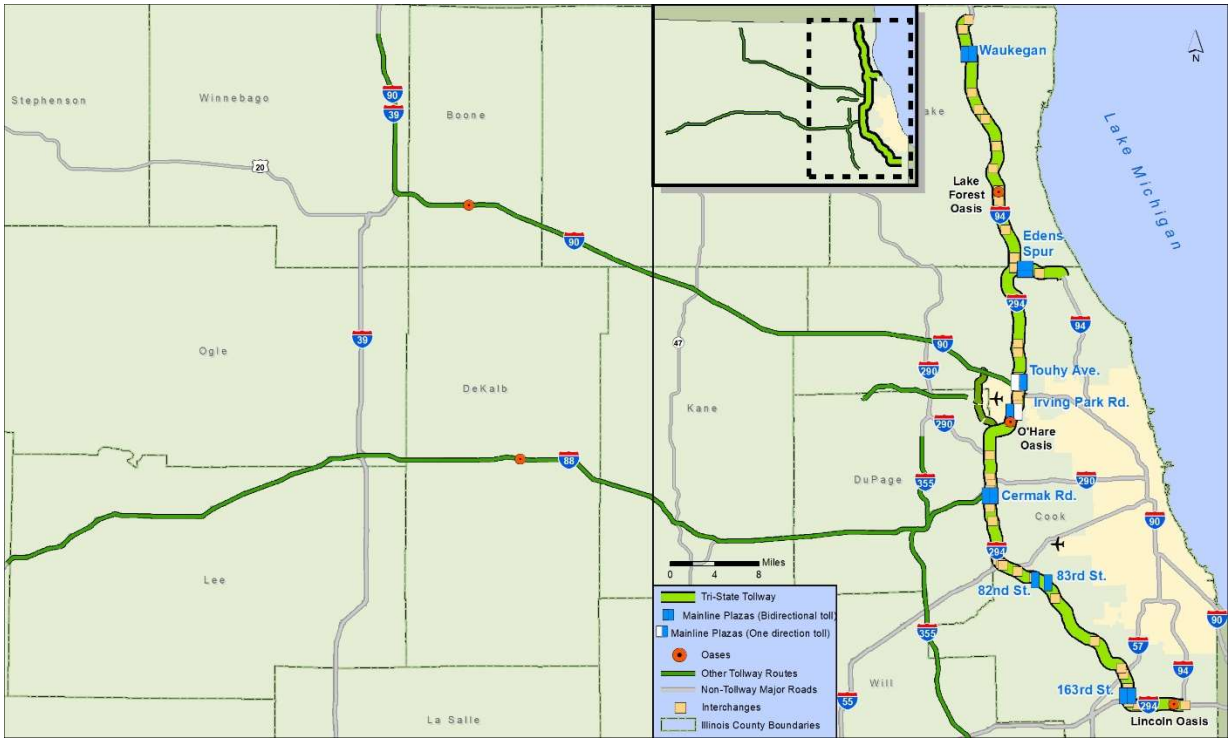


Figure 1-4. Tri-State Tollway Location Map

The primary function of the Tri-State Tollway is to allow vehicles to bypass the urban core of the Chicago region, connecting suburban communities from the Indiana border to the Wisconsin border. The Tri-State Tollway also provides access between the northern and southern suburbs to Chicago O'Hare International Airport. In the southern I-294/I-80 section, where the route runs east-west, the Tri-State Tollway is part of a major cross-country commercial route running from New York to San Francisco.

The northern section passes through Lake County, a mature suburban area. Waukegan, with a population of approximately 88,000, is situated near the northern end of I-94. Lake County has experienced significant growth for the last three decades, specifically central Lake County, west of I-94. Northern Cook and Lake Counties, through which I-94 passes, have experienced steady employment growth and are home to numerous corporate headquarters, including AbbVie,

Abbott Laboratories, Allstate Insurance, Baxter Laboratories, CDW, Discover Financial Services, Mondelez International, and Walgreens. Much of this dense, regional employment is located adjacent to I-94, forming a heavily traveled commuter facility.

With direct access via I-190, Chicago O'Hare International Airport and the surrounding commercial and manufacturing development provide significant trip generation for the Central Tri-State Tollway (I-294). Land surrounding the airport is densely populated with mature commercial, industrial, and residential areas. The DuPage County suburbs to the west of I-294 are also a mature mix of office, manufacturing, and residential land uses.

The south section of I-294 passes through an area with a high concentration of manufacturing activity, particularly heavy industry. Manufacturing declines over the last three decades have negatively impacted these southern suburbs and the area immediately to the east in Indiana. Therefore, many south suburban residents use I-294 to travel to jobs in the western and northern suburbs.

1.4.3 Reagan Memorial Tollway (I-88)

The Reagan Memorial Tollway, designated as I-88 for its entire length, extends from the Tri-State Tollway (I-294) near the Cook–DuPage County line (15 miles west of downtown Chicago) at the east end, to the eastern edge of Whiteside County in north central Illinois (near Rock Falls) at the west end, as illustrated in Figure 1-5. Under the Congestion-Relief Program (CRP), I-88 was widened to eight lanes from Milepost 123.1 to 137.1, giving the route an eight-lane cross section for the eastern 17 miles, from the eastern terminus to IL 59. By the end of 2012, the section between IL 59 and IL 56 was widened to six lanes by adding a lane in each direction between Orchard Road and IL 56.

Figure 1-5. Reagan Memorial Tollway Location Map

At the western end of the Tollway's jurisdiction at US Route 30, I-88 continues as a non-tolled route for an additional 44 miles, terminating at I-80, east of the Davenport–Moline–Rock Island metropolitan area (also known as the Quad Cities). East of the Tri-State Tollway (I-294), the route continues as I-290—the Eisenhower Expressway—providing access to the Chicago central business district. There are a total of five mainline toll plazas (Dixon, DeKalb, Aurora, Meyers Road, and York Road), and 14 ramp plazas, along the Reagan Memorial Tollway.

From its eastern terminus, I-88 passes through mature communities in DuPage County and eastern Kane County. These suburban communities have seen exceptionally high growth over the past few decades, with developable land rapidly diminishing. Aurora and Naperville have populations of approximately 200,000 and 147,000, respectively, making them two of the most populated communities in Illinois. Numerous corporate headquarters for major employers such as Dover, Navistar, TreeHouse Foods, and Univar are located along I-88, as well as regional retail centers such as Chicago Premium Outlets, Yorktown Center, and Oakbrook Mall. As available land has become scarcer, development has pushed west of the Fox River Valley, deeper into Kane County. While the rapid pace of development slowed considerably following the 2007–08 housing crisis, this area remains abundant with desirable and developable land. Kane County, which marks the transition from predominantly suburban to rural land use, is one of the fastest growing counties in Illinois. Much of the remaining western portion of the I-88 corridor passes through rural communities and agricultural land, which is less densely populated and not anticipated to change significantly over the term of this forecast.

1.4.4 Veterans Memorial Tollway (I-355)

The Veterans Memorial Tollway is designated as I-355 for its entire length of 29.8 miles. As shown in Figure 1-6, it extends from its northern terminus at Army Trail Road in DuPage County to its southern terminus at I-80 in Will County. Most of the roadway is six lanes, with a short eight-lane segment between I-88 and 75th Street and another eight-lane segment between IL 38 (Roosevelt Road) and IL 56 (Butterfield Road). There are three mainline toll plazas (Army Trail Road, Boughton Road, and Spring Creek), and 11 ramp plazas, along the Veterans Memorial Tollway.

On November 11, 2007, the Tollway opened the I-355 south extension between I-55 and I-80. This 12.5-mile extension increased capacity and improved regional mobility. The I-355 corridor now directly connects three major interstate highways (I-80, I-55, and I-88). It also connects to I-290 via a short, untolled portion of I-355, providing an alternate interstate route between I-80 and I-90. As a result, I-355 has attracted more truck traffic as longer haul trucks attempt to bypass more congested parts of the region. This access has made I-355 a significant freight corridor, supporting the development of warehouse and logistics facilities, particularly to the south in Will County.

Developed suburban land characterizes the I-355 corridor, particularly within DuPage County. Undeveloped land flanking the original section of the corridor (from Army Trail Road to I-55) is diminishing, although developable land is located along the I-355 south extension in Will County, where rapid growth is expected in coming decades.

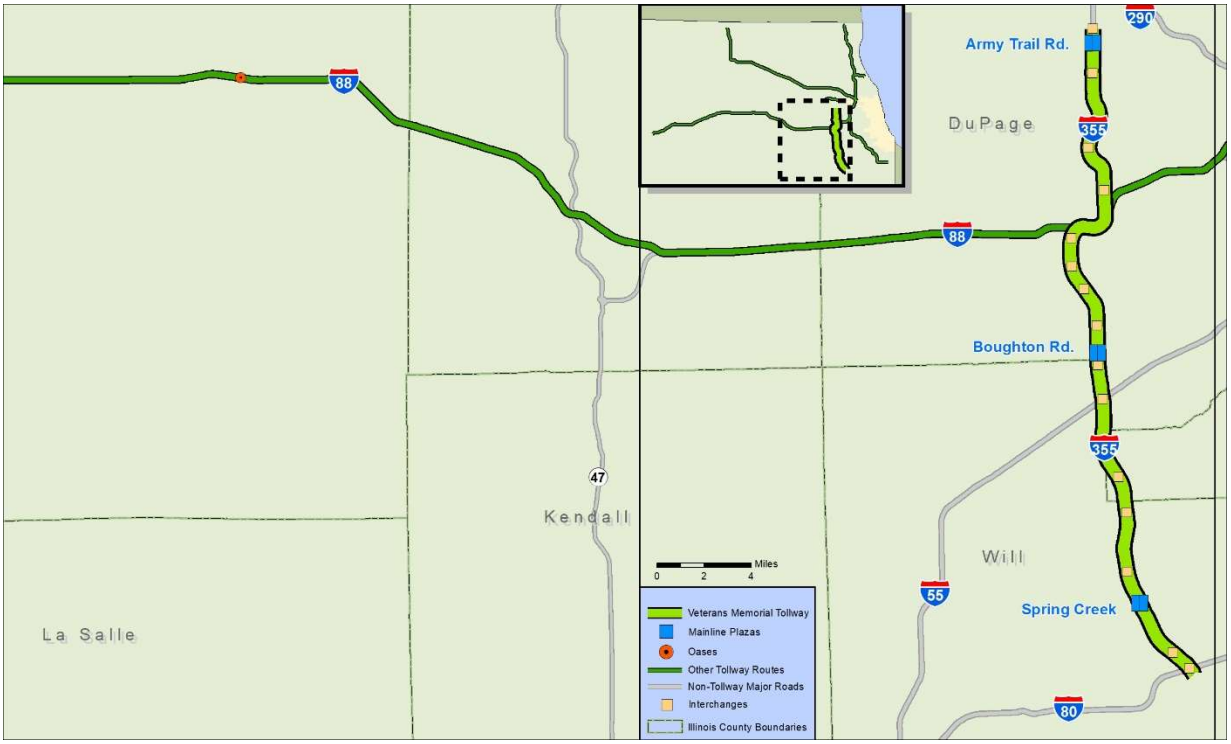


Figure 1-6. Veterans Memorial Tollway Location Map

1.4.5 Illinois Route 390 Tollway and I-490 Tollway

As shown in Figure 1-7, the IL 390 Tollway is located in the suburban area northwest of Chicago and extends from Lake Street (U.S. Route 20) at the west end to Busse Road (IL 83) at the east end. Tolling on the western section—between Lake Street (U.S. Route 20) and Rohlwing Road—began on July 5, 2016. This limited-access expressway originally opened in 1993 as the Elgin-O'Hare Expressway. It was widened and became a part of the Illinois Tollway system in 2016. The eastern extension—between Rohlwing Road and IL 83—was completed and opened to traffic on November 1, 2017. The IL 390 Tollway serves a mix of residential, office, and industrial land uses. The latter includes a major industrial district in Elk Grove Village, one of the region's largest manufacturing and logistics clusters. Reflecting this land use pattern, CVs represent about 15 percent of the total traffic along the eastern half of the IL 390 Tollway, which is among the highest CV share of any suburban Tollway corridor.

A sixth Tollway route, the I-490 Tollway, is under construction and planned for completion in 2026. This new north-south route will run along the western border of Chicago O'Hare International Airport, extending from the Jane Addams Tollway (I-90) at the north end to the Central Tri-State Tollway (I-294) at the south end. It will connect with the eastern terminus of the IL 390 Tollway. Similar to the eastern half of the IL 390 Tollway, the I-490 corridor is characterized by a strong industrial character.

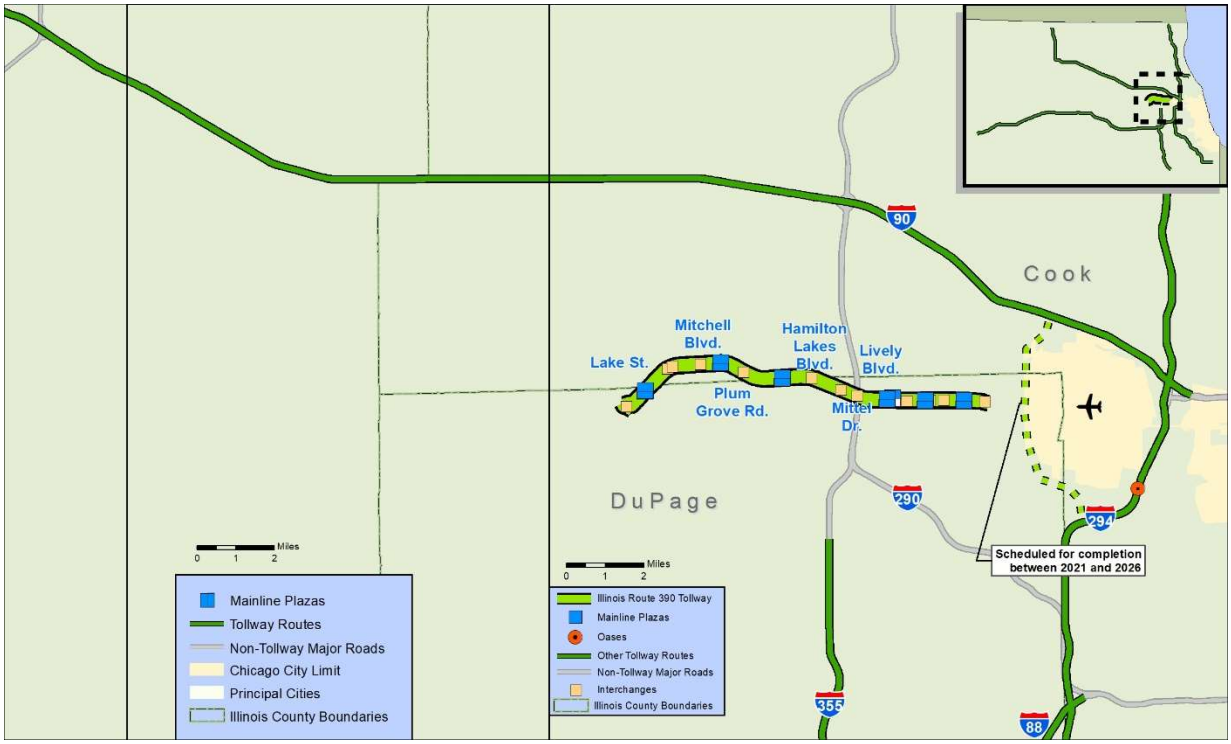


Figure 1-7. Illinois Route 390 Tollway and I-490 Tollway Location Map

Together, the IL 390 and I-490 Tollways provide a combined 17 miles of new roads and 15 new or improved interchanges in the northwest suburbs. The new toll roads will enhance access to Chicago O'Hare International Airport property with new rail crossings and connections. Because of the overall magnitude of the project and the potential to enhance the national and regional economies, it is designated a "Project of National and Regional Significance" by federal transportation legislation.

1.5 Illinois Tollway Capital Programs

The Illinois Tollway has undertaken two major capital programs since 2004, which are described subsequently. A detailed description of the current capital program is provided in Chapter 5.

1.5.1 Congestion-Relief Program: Open Roads for a Faster Future (2004)

In September 2004, the Illinois Tollway Board of Directors (Board) approved a long-range capital plan, called the Congestion-Relief Program (CRP): Open Roads for a Faster Future. At the same time, the Board approved a new toll rate structure that was put into effect on January 1, 2005, to help finance the capital program. The Illinois Tollway's toll rate structure had remained essentially the same from 1983 through the end of 2004. The CRP added roadway capacity to reduce existing congestion and accommodate future traffic growth. Some notable widening projects, by route, include the following:

- **Jane Addams Memorial Tollway (I-90)** – Added one lane in each direction between Newburg Road and Rockton Road, from approximately Milepost 3.0 to 17.0. This work was completed in 2009.

- **Tri-State Tollway (I-294/I-80)** – Added one lane in each direction from the southern terminus to 95th Street, from Milepost 0.0 to 17.6. Opened in phases through 2009.
- **Tri-State Tollway (I-94/I-294)** – Added one lane in each direction from Balmoral Avenue to IL 173, from Milepost 40.0 to 75.7. Opened in phases through 2009.
- **Reagan Memorial Tollway (I-88)** – Added one lane in each direction from IL 59 to IL 83, from Milepost 123.3 to 137.1. Opened in phases through 2009.
- **Veterans Memorial Tollway (I-355)** – Added one lane in each direction from 75th Street to Ogden Avenue, from Milepost 15.5 to 19.5. This work was completed in 2009.

Each of the widening projects also included some existing roadway reconstruction. Additionally, the CRP reduced delays at toll plazas by converting all 22 mainline toll plazas to open road tolling (ORT) by October 2006. Finally, the CRP funded a new 12.5-mile addition to the system, the I-355 south extension, which opened on November 11, 2007.

1.5.2 Move Illinois Program (2011)

Following an 18-month review and public discussion of the Illinois Tollway's needs for its existing system and opportunities to improve regional mobility, the Illinois Tollway Board of Directors adopted a 15-year, $12 billion capital program in August 2011. The program is called Move Illinois: The Illinois Tollway Driving the Future. In April 2017, the Board approved an amendment of the Move Illinois program to add $2.1 billion in support of an expanded scope for the Central Tri-State Tollway (I-294). The revised scope includes new capacity, improved interchange configuration, and other improvements to the Central Tri-State Tollway. Construction began in July 2018.

Move Illinois is funded through a combination of current toll revenue and bonds backed by future toll revenues. In anticipation of Move Illinois, passenger car (PC) toll rates were increased effective January 1, 2012. In addition, a three-phased CV toll rate increase was implemented between 2015 and 2017. Starting January 1, 2018, CV rates began increasing annually at the rate of inflation. Move Illinois, originally scheduled to be completed by 2026, currently is scheduled to be completed in 2027.

- Rebuilding and widening I-90 between Rockford and the Kennedy Expressway was completed in December 2016.
- Reconstructing and widening I-294. The Central Tri-State Tollway is being reconstructed from Balmoral Avenue to 95th Street. Construction began in 2018 on the northern section between Balmoral Avenue and the O'Hare Oasis. The full reconstruction project is expected to be completed at the end of 2026.
- Constructing the Elgin O'Hare Western Access (EOWA) Project, which includes widening, tolling, and extending the former Elgin-O'Hare Expressway and constructing the new I-490 Tollway. During the first phase of the EOWA Project, the IL 390 Tollway (formerly the Elgin-O'Hare Expressway) began tolling operations in July 2016. The second phase, an eastward extension of the IL 390 Tollway, opened on November 1, 2017. The timing for

completion of the remainder of the EOWA Project, construction of I-490, is subject to change; for purposes of this report, the additional phases are assumed to open in 2026, based on discussions with Illinois Tollway staff.

- Constructing the I-294/I-57 interchange. The first phase of the I-294/I-57 interchange opened to traffic in October 2014. The next phase is currently under construction and is scheduled to be completed in 2023.

1.6 Toll Collection and Toll Rates

The Illinois Tollway collects tolls at 28 mainline plazas and 61 ramp plazas. Payment options currently include electronic toll collection (ETC) via I-PASS or E-ZPass, Pay By Plate, invoice, or online payment within a 14-day grace period. As a precaution to prevent the spread of COVID-19 to Tollway customers and employees, the Illinois Tollway suspended cash collections systemwide on March 13, 2020. While initially a temporary practice, the Tollway subsequently made the suspension of cash payment permanent on February 25, 2021.

The Illinois Tollway system first implemented ETC in 1993 with a small pilot program on part of the Veterans Memorial Tollway (I-355). In 1994, electronic tolling expanded to other plazas, and in 1995, I-PASS-Only lanes were introduced. In 1998, the Illinois Tollway began installing I-PASS Express lanes that enable drivers to pay tolls while traveling at higher speeds through the plazas. ORT, which allows I-PASS payment at highway speeds, was introduced on all mainline plazas between 2005 and 2006. With ORT, vehicles paying by I-PASS never have to leave their travel lane to pay a toll, and there is no reduction in the number of lanes. Drivers with I-PASS simply pass under the toll gantry in their current lane.

1.6.1 Toll Rate Changes

Historical toll rates at typical plazas are illustrated in Table 1-1. While actual rates vary by plaza, most of the rates charged at mainline plazas on the three original routes (Tri-State, Jane Addams Memorial, and Reagan Memorial) are similar. There have been four toll rate changes applied to all PC transactions: an average increase of 17 percent in 1963, a decrease of 14 percent in 1970, a 37-percent increase in 1983, and an 87.5-percent increase in 2012. Additionally, there was a PC increase in 2005 that applied to only cash-paying vehicles. The 2005 toll rate schedule simplified the former 10 toll rate classes to four rate tiers—one for PCs and three for CVs.

CVs had three rate increases prior to 2015: 50 percent in 1963; 68 percent in 1983; and an average of 216 percent for non-discounted, daytime rates in 2005. Between 2015 and 2017, a three-phase, 60-percent increase was applied to CV rates. Beginning in 2018, all CV rates are adjusted annually at the rate of inflation.

The Tollway offers a 50-percent discount on tolls to PC customers using I-PASS. While the I-PASS discount does not extend to CV customers, the Tollway offers an overnight toll rate discount for CV travel between 10:00 p.m. and 6:00 a.m.

Table 1-1. Current and Historical Toll Rates on Illinois Tollway Typical Mainline Plazas[a]

Vehicle Classification		Previous Rates							Current Rates
		1959–1963	1964–1970	1971–1983	1983–2004	2005-2011[d]	2012-2014[d]	2015-2020[d,e]	2021[d,e]
1[b]	Automobile, motorcycle, single-unit truck or tractor, two axles, four or fewer tires	$0.30	$0.35	$0.30	$0.40	$0.40	$0.75	$0.75	$0.75
2[c]	Single-unit truck or tractor, buses, two axles, six tires	$0.40	$0.45	$0.30	$0.50	$1.00	$1.00	$1.40–$1.70	$1.75
3[c]	Trucks with three or four axles, buses, and Class 1 vehicles with a one- or two-axle trailer	$0.50	$0.50–$0.60	$0.45–$0.60	$0.60–$1.00	$1.75	$1.75	$2.45–$3.00	$3.00
4[c]	Trucks with five or six axles, miscellaneous PC special, or unusual vehicles not classified in Tiers 1, 2, or 3	$0.50	$0.75–$0.90	$0.75–$1.00	$1.25–$1.75	$3.00	$3.00	$4.20–$5.10	$5.20

[a] The toll rates listed in the table are toll rates for 11 of the 28 mainline plazas on the Tollway System. Toll rates at the other 17 mainline plazas differ by various amounts. A complete listing of toll rates at each Tollway system plaza may be found on the Illinois Tollway's website. No other information from the Tollway website is incorporated by reference.

[b] Rate for Tier 1 vehicles for the following situations: customers who pay via I-PASS and out-of-state transponders that are tolled at the discounted rate. The non-discounted rate applies to non-I-PASS forms of payment.

[c] CVs (Rate Tiers 2 through 4) are tolled at a discounted rate during the overnight period from 10:00 p.m. to 6:00 a.m., whether paying by I-PASS or cash (the "overnight discount rate"). Overnight discount rates are shown in the table. Prior to January 1, 2009, CVs paying by I-PASS were tolled at the discounted rate for certain off-peak time periods (the "I-PASS off-peak discount rate"). This I-PASS off-peak discount rate expired on December 31, 2008. The overnight discount rate continues.

[d] Beginning in 2005, the Tollway has offered a 50 percent toll rate discount to I-PASS transactions. Toll rates shown in the table are the I-PASS rate.

[e] A CV toll rate increase occurred in three phases between 2015 and 2017 and resulted in a total increase of 60.0 percent over 2014 rates. Annual, inflation-based increases began January 1, 2018.

The most recent PC rate increase occurred on January 1, 2012, and raised rates by 87.5 percent. This rate change increased the typical mainline toll from $0.40 to $0.75 for I-PASS customers and from $0.80 to $1.50 for cash customers. The CV rate changes from 2015 to 2017 increased the typical mainline toll from $4.00 in 2014 to $6.40 in 2017 for large CVs (Rate Tier 4) and from $1.50 to $2.40, in respective years, for small CVs (Rate Tier 2). As of January 1, 2018, CV rates began to increase annually based on the rate of inflation, rounded to the nearest $0.05.[2] In 2018, 2019, 2020, and 2021, CV rates increased based on inflation increases of 1.84, 2.25, 2.07, and 1.56 percent, respectively. CVs have no toll rate differential between cash and I-PASS payments. CVs do receive, however, a discount for overnight travel (i.e., travel between 10:00 p.m. and 6:00 a.m.) and pay a higher toll rate for the Pay Online option on the new IL 390 Tollway. The overnight discount began in 2005 and ranges from 18.5 to 34.8 percent, depending on rate tier and plaza.

Even with the recent rate increases, the Illinois Tollway is still among the lower-priced toll roads in the country on a per-mile basis. As a comparison, Table 1-2 lists electronic toll collection rates for major toll roads in the United States.

Table 1-2. Toll Rates for U.S. Facilities[a]

	$PER MILE	
Agency or Facility	**PC**	**5-Axle Truck**
Adams Avenue Parkway, Inc (UT)	$1.00	$2.50
Skyway Concession Company (IL)	$0.74	$4.36
Pocahontas Parkway[b]	$0.53	$0.92
City of Chesapeake (VA)	$0.52	$0.66
Transportation Corridor Agencies (CA)	$0.51	$1.89
Northwest Parkway, LLC (CO)	$0.46	$1.85
Dulles Greenway[c]	$0.41	$1.25
Montgomery County Toll Road Authority (TX)	$0.36	$1.42
Metropolitan Washington Airports Authority (VA)	$0.35	$0.97
Central Texas Regional Mobility Authority (TX)	$0.31	$1.25
E-470 Public Highway Authority (CO)	$0.31	$1.16
San Diego Association of Governments (CA)	$0.28	$0.55
Orchard Pond Greenway, LLC (FL)	$0.26	$1.04
Tampa-Hillsborough County Expressway Authority (FL)	$0.24	$0.97
Fort Bend County Toll Road Authority (TX)	$0.23	$0.94
Southern Connector[d]	$0.23	$0.76
North East Texas Regional Mobility Authority (TX)	$0.21	$0.83
Richmond Metropolitan Transportation Authority (VA)	$0.21	$0.29
Texas Department of Transportation (TX)	$0.20	$0.74
North Texas Tollway Authority (TX)	$0.19	$0.77
SH 130 Concession Company, LLC (TX)	$0.19	$0.77
Harris County Toll Road Authority (TX)	$0.19	$0.87

[2] Consumer Price Index for all Urban Consumers (CPI-U), or its successor index, over the 12-month period ending on June 30th of the previous year. Source: Illinois Tollway Board Resolution No. 18516, dated November 20, 2008.

Agency or Facility	$PER MILE	
	PC	5-Axle Truck
Delaware Department of Transportation (DE)	$0.18	$0.40
North Carolina Turnpike Authority (NC)	$0.18	$0.71
Cameron County Regional Mobility Authority (TX)	$0.17	$0.67
Central Florida Expressway Authority (FL)	$0.16	$0.39
Osceola County (FL)	$0.16	$0.65
Miami-Dade Expressway Authority (FL)	$0.16	$0.32
New Jersey Turnpike Authority (NJ) - New Jersey Turnpike	$0.16	$0.52
Mid-Bay Bridge Authority (FL)	$0.14	$0.73
South Jersey Transportation Authority (NJ)	$0.14	$0.47
Pennsylvania Turnpike Commission (PA)	$0.13	$0.66
South Carolina Department of Transportation (SC)	$0.11	$0.55
Maryland Transportation Authority (MD)	$0.10	$0.70
West Virginia Parkways, Economic Development, and Tourism Authority (WV)	$0.09	$0.37
Florida Turnpike Enterprise (FL)	$0.08	$0.29
Indiana Toll Road Concession Company (IN)	$0.08	$0.41
Virginia Department of Transportation (VA)	$0.08	$0.15
Illinois State Toll Highway Authority (IL)	$0.07	$0.56
New Jersey Turnpike Authority (NJ) - Garden State Parkway	$0.07	NA
Oklahoma Turnpike Authority (OK)	$0.06	$0.22
Maine Turnpike Authority (ME)	$0.06	$0.23
Ohio Turnpike and Infrastructure Commission (OH)	$0.06	$0.18
New York State Thruway Authority (NY)	$0.05	$0.27
Florida Department of Transportation (FL)	$0.05	$0.20
Kansas Turnpike Authority (KS)	$0.05	$0.13
Massachusetts Department of Transportation (MA)	$0.04	$0.17
New Hampshire Department of Transportation (NH)	$0.04	$0.19
National Average	**$0.11**	**$0.45**

[a] Toll rates are for electronic payments at peak hour rates, if applicable. Toll rates are for full-length trips, with the exception of the Garden State Parkway, where 5-axles trucks are not allowed on the entire facility. Toll rates are current as of June 2021.

[b] The Pocahontas Parkway is managed by Globalvia.

[c] The Dulles Greenway is managed by Toll Road Investors Partnership II.

[d] The Southern Connector is managed by Connector 2000 Association.

The Illinois Tollway implemented a change to how video tolls (V-Tolls) are assessed effective February 1, 2018. A V-Toll occurs when no transponder is read, but, upon image review, the license plate is found to correspond to an I-PASS account. This may happen for various reasons, including the improper mounting of, or absence of, an I-PASS transponder. Under the revised policy, I-PASS customers that are V-Tolled more than five times in a calendar month on any individual license plate registered to a customer's I-PASS or electronic tolling account will be charged the cash toll rate for the sixth and every subsequent V-Toll incurred that month. In 2019 and 2020, the Tollway collected approximately $11.9 million and $10.1 million in V-Toll surcharge revenue, respectively.

1.6.2 I-PASS Usage

The percentage of transactions paid with I-PASS has increased over time. The increase has been gradual in most years, with the most notable exception being a sharp increase in late 2004, leading up to the toll rate increase of January 1, 2005, when the PC toll rate doubled and a discount for I-PASS users was established. I-PASS usage increased from 49.8 percent of transactions in 2004 to 74.7 percent in 2005.

The Illinois Tollway joined the E-ZPass Interagency Group in 2005. Membership in this group allows for sharing of an in-vehicle transponder for toll payment on all member facilities. In this report, the term "I-PASS" when used in the context of toll payments usually means payment via the I-PASS transponder or any other transponder within the E-ZPass Interagency Group.

Between 2005 and 2015, I-PASS usage grew an average of 1.2 percentage points per year to 86.6 percent (Table 1-3).

Table 1-3. I-PASS Annual Usage Rates

Year	I-PASS Annual Usage Rate
2005	74.7%
2006	78.4%
2007	79.7%
2008	81.0%
2009	81.7%
2010	82.6%
2011	83.9%
2012	86.3%
2013	86.5%
2014	86.6%
2015	86.6%
2016	87.0%
2017	87.8%
2018	90.6%
2019	90.7%
2020	89.1%

The conversion of all mainline plazas to an ORT configuration in 2006 and the introduction of cashless tolling contributed to this growth rate. (The first cashless plaza opened in 2009.) The largest year-over-year increase (2.4 percentage points) occurred in 2012, following the January 2012 PC toll rate increase. Between 2012 and 2015, I-PASS growth slowed to an average of 0.1 percentage point per year.

In recent years, I-PASS usage grew with the opening of several new cashless ramp plazas, the two-phase opening of the all cashless IL 390 Tollway in July 2016 and November 2017, and the implementation of the new V-Toll policy in February 2018. Between 2015 and 2019, I-PASS usage grew an average of 1.0 percentage point per year to 90.7 percent in 2019.

In 2020, I-PASS usage was impacted by the COVID-19 pandemic, as well as changes in toll collection implemented by the Tollway. The share of transactions paid via I-PASS or E-ZPass accounts was 89.1 percent for the year, representing a slight decline from 2019. Changes in toll collection include the suspension of cash collections in mid-March 2020, as well as the introduction of a new Pay By Plate option and a new invoicing process in the summer.

Table 1-4 presents ETC rates by toll agency in 2019, the latest year in which ETC usage is available for all listed facilities. As shown, the Illinois Tollway continues to rank among the top toll agencies in ETC participation. Only one agency, the Metropolitan Transportation Authority in New York, had a higher ETC usage rate for 2019.

Table 1-4. 2019 Electronic Tolling Collection Usage Rates for U.S. Toll Agencies

ETC Usage Rank	ETC Usage Rates	Toll Agency Name	Name of ETC System
1	95.1%	Metropolitan Transportation Authority (NY)	E-ZPass
2	90.7%	Illinois Tollway	I-PASS
3	87.8%	Port Authority of New York and New Jersey	E-ZPass
4	86.9%	New Jersey Turnpike Authority	E-ZPass
5	86.0%	Massachusetts Department of Transportation	E-ZPass
6	85.7%	Indiana Toll Road Concession Company	E-ZPass
7	83.5%	Florida's Turnpike	SunPass
8	83.0%	North Texas Tollway Authority	Toll Tag
9	82.5%	Pennsylvania Turnpike Commission	E-ZPass
10	82.0%	Maryland Transportation Authority	E-ZPass
11	78.9%	Oklahoma Turnpike Authority	PIKEPASS
12	78.7%	New York State Thruway Authority	E-ZPass
13	74.6%	Harris County Toll Road Authority (Houston)	E-Z Tag
14	72.0%	Bay Area Toll Authority	FasTrak
15	64.6%	Ohio Turnpike Commission	E-ZPass

Source for electronic toll collection (ETC) usage: Respective toll facilities' webpages and E-ZPass Interagency Group Settlement Reports.

Chapter 2

Historical Performance & Recent Trends

This chapter analyzes historical toll traffic and revenue trends for the Illinois Tollway. It also provides a detailed review of recent traffic trends. It concludes with an overview of typical travel patterns by month, day, and hour.

2.1 Historical Toll Traffic and Revenue Trends

Figure 2-1, Table 2-1, and Table 2-2 provide the Illinois Tollway's annual transactions and toll revenue from the first full year of operation in 1959 through 2020. In this report, historical toll revenue is presented differently than projected toll revenue, as provided in Chapter 5. The projected toll revenue is expected revenue, which is the revenue that would be collected if every vehicle paid the exact published toll based on vehicle class, time of day, and payment type. The historical toll revenue, the source of which is the Illinois Tollway Annual Comprehensive Financial Report (ACFR), is the toll revenue remaining after accounting for overpayments, underpayments, exemptions, and toll avoidance. Historical toll revenue does not include tolls and fines collected through the violation enforcement system; these are reported separately in Illinois Tollway financial statements as Toll Evasion Recovery.

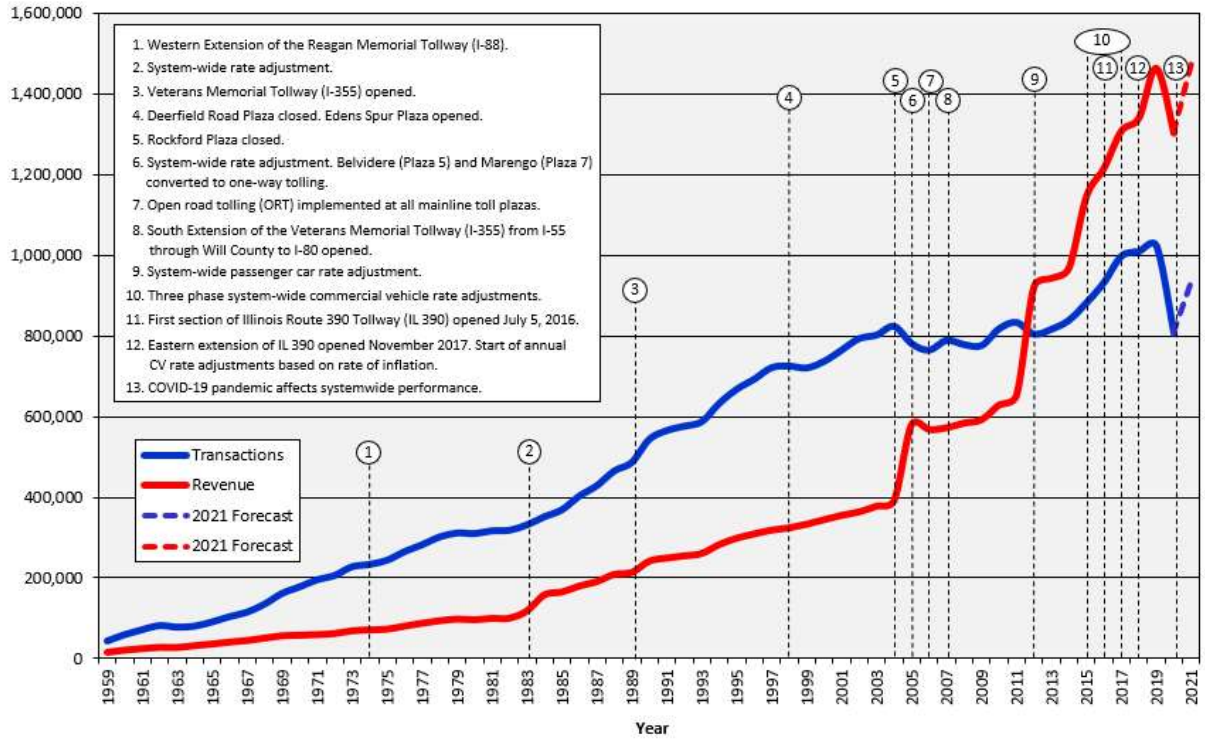


Figure 2-1. Illinois Tollway Systemwide Annual Transactions & Toll Revenue (in thousands)

Table 2-1. Illinois Tollway Systemwide Annual Transactions (in thousands)

Year	PCs	PC AAPC[a]	CVs	CV AAPC[a]	Total	Total AAPC[a]
1959	37,884	–	5,050	–	42,934	–
1964	72,721	13.9%	7,005	6.8%	79,726	13.2%
1969	146,476	15.0%	14,488	15.6%	160,964	15.1%
1970	160,916	9.9%	16,187	11.7%	177,103	10.0%
1975	216,180	6.1%	26,914	10.7%	243,094	6.5%
1980	269,106	4.5%	40,183	8.3%	309,289	4.9%
1982	278,508	1.7%	38,993	-1.5%	317,501	1.3%
1983[b]	290,687	4.4%	40,116	2.9%	330,803	4.2%
1985	324,673	5.7%	43,543	4.2%	368,216	5.5%
1989[b]	428,745	7.2%	57,193	7.1%	485,938	7.2%
1990	485,085	13.1%	57,962	1.3%	543,047	11.8%
1995	597,026	4.2%	70,179	3.9%	667,205	4.2%
2000	664,002	2.1%	72,308	0.6%	736,310	2.0%
2001	687,856	3.6%	76,429	5.7%	764,285	3.8%
2002	715,073	4.0%	77,763	1.7%	792,836	3.7%
2003	693,507	-3.0%	108,096	39.0%	801,603	1.1%
2004	714,120	3.0%	109,025	0.9%	823,145	2.7%
2005[b]	695,378	-2.6%	85,068	-22.0%	780,446	-5.2%
2006[c]	678,535	-2.4%	85,590	0.6%	764,125	-2.1%
2007[d]	696,055	2.6%	92,237	7.8%	788,292	3.2%
2008	688,516	-1.1%	89,366	-3.1%	777,882	-1.3%
2009	694,837	0.9%	80,516	-9.9%	775,353	-0.3%
2010	730,797	5.2%	86,286	7.2%	817,083	5.4%
2011	743,195	1.7%	89,633	3.9%	832,828	1.9%
2012[e]	711,680	-4.2%	92,100	2.8%	803,780	-3.5%
2013	720,513	1.2%	95,529	3.7%	816,042	1.5%
2014	737,238	2.3%	101,041	5.8%	838,279	2.7%
2015[b]	777,719	5.5%	103,896	2.8%	881,615	5.2%
2016[b,e]	823,643	5.9%	108,248	4.2%	931,891	5.7%
2017[b,e]	883,468	7.3%	113,866	5.2%	997,334	7.0%
2018[b]	889,184	0.6%	119,768	5.2%	1,008,952	1.2%
2019[b]	900,809	1.3%	122,413	2.2%	1,023,222	1.4%
2020[b]	686,065	-23.8%	120,584	-1.5%	806,650	-21.2%
GROWTH RATES (AAPC[a])						
1959–1980		9.8%		10.4%		9.9%
1980–1990		6.1%		3.7%		5.8%
1990–2000		3.2%		2.2%		3.1%
2000–2010		1.0%		1.8%		1.0%
2010–2020		-0.6%		3.4%		-0.1%

[a] Average annual percent change.
[b] Toll rate adjustment.
[c] Open road tolling (ORT) implemented at all mainline toll plazas.
[d] Veterans Memorial Tollway (I-355) south extension opened.
[e] Portions of Illinois Route 390 Tollway opened in July 2016 and November 2017.

Table 2-2. Illinois Tollway Systemwide Annual Revenue (in thousands)[a]

Year	PCs	PC AAPC[b]	CVs	CV AAPC[b]	Total	Total AAPC[b]
1959	$11,943	–	$2,593	–	$14,536	–
1964	26,284	17.1%	4,888	13.5%	31,172	16.5%
1969	46,872	12.3%	8,803	12.5%	55,675	12.3%
1970	47,565	1.5%	9,343	6.1%	56,908	2.2%
1975	58,784	4.3%	13,277	7.3%	72,061	4.8%
1980	73,248	4.5%	22,204	10.8%	95,452	5.8%
1982	76,004	1.9%	23,148	2.1%	99,152	1.9%
1983[c]	88,074	15.9%	29,154	25.9%	117,228	18.2%
1985	120,397	16.9%	43,901	22.7%	164,298	18.4%
1989[c]	155,394	6.6%	57,387	6.9%	212,781	6.7%
1990	183,237	17.9%	57,842	0.8%	241,079	13.3%
1995	227,519	4.4%	70,389	4.0%	297,908	4.3%
2000	268,277	3.4%	75,668	1.5%	343,945	2.9%
2001	276,724	3.1%	78,050	3.1%	354,774	3.1%
2002	276,763	0.0%	86,472	10.8%	363,235	2.4%
2003	275,751	-0.4%	101,703	17.6%	377,454	3.9%
2004	287,218	4.2%	104,368	2.6%	391,586	3.7%
2005[c]	341,352	18.8%	239,090	129.1%	580,442	48.2%
2006[d]	324,556	-4.9%	242,943	1.6%	567,499	-2.2%
2007[e]	321,008	-1.1%	251,085	3.4%	572,093	0.8%
2008	335,653	4.6%	247,994	-1.2%	583,647	2.0%
2009	334,520	-0.3%	257,543	3.9%	592,063	1.4%
2010	348,946	4.3%	279,808	8.6%	628,754	6.2%
2011	354,186	1.5%	298,488	6.7%	652,674	3.8%
2012[c]	615,957	73.9%	306,433	2.7%	922,390	41.3%
2013	622,349	1.0%	320,803	4.7%	943,152	2.3%
2014	630,556	1.3%	338,416	5.5%	968,972	2.7%
2015[c]	662,720	5.1%	483,909	43.0%	1,146,629	18.3%
2016[c,f]	686,846	3.6%	529,452	9.4%	1,216,298	6.1%
2017[c,f]	724,905	5.5%	584,285	10.4%	1,309,190	7.6%
2018[c]	719,165	-0.8%	621,886	6.4%	1,341,051	2.4%
2019[c]	726,063	1.0%	654,688	5.3%	1,380,751	3.0%
2020[c]	522,789	-28.0%	626,231	-4.3%	1,149,020	-16.8%
GROWTH RATES (AAPC[b])						
1959–1980		9.0%		10.8%		9.4%
1980–1990		9.6%		10.0%		9.7%
1990–2000		3.9%		2.7%		3.6%
2000–2010		2.7%		14.0%		6.2%
2010–2020		4.1%		8.4%		6.2%

[a] Collected revenue.
[b] Average annual percent change.
[c] Toll rate adjustment.
[d] Open road tolling (ORT) implemented at all mainline toll plazas.
[e] Veterans Memorial Tollway (I-355) south extension opened.
[f] Portions of Illinois Route 390 Tollway opened in July 2016 and November 2017.

Over the course of the Illinois Tollway's history, transactions have increased steadily, with only a few year-to-year declines. The rate of transaction growth, however, has slowed as the Illinois Tollway's service area has matured. The average annual increase in transactions in the first two decades (1959–1980) was 9.9 percent. Between 1980 and 2010, transaction growth successively decreased in each decade. Since 2010, transaction growth has increased as new capacity has been added to the Tollway, including the widening of the Jane Addams Memorial Tollway (I-90) and the addition of the new IL 390 Tollway. Two exceptions to the recent growth trend are 2012 and 2020, when transactions fell by 3.5 percent and 21.2 percent, respectively, on an annual basis. The decline in 2012 is primarily attributable to the 2012 PC toll rate increase. The decline in 2020 is due to the impacts of the COVID-19 pandemic. PC traffic was impacted most significantly by the pandemic, falling 23.8 percent, while CV transactions performed comparatively well, falling only 1.5 percent year-over-year. This performance is broadly similar to that of other major U.S. toll road facilities' performance throughout the pandemic. Performance in the first eight months of 2021 demonstrates an increase over the same period in 2020 (16.5 percent increase for PCs and 10.2 percent increase for CVs) but remains below 2019 levels overall (12.1 percent decrease for PCs and 5.9 percent increase for CVs).

Annual toll revenues generally have displayed a growth pattern similar to transactions. However, periodic jumps in revenue have occurred as a result of toll rate increases. Between 1959 and 1980, revenue increased an average of 9.4 percent per year. In the following decade, between 1980 and 1990, average annual revenue growth increased to 9.7 percent per year. Lower growth, 3.6 percent per year, occurred between 1990 and 2000, when there were no toll increases. Since 2000, revenue has grown at a faster rate due to the following multiple toll rate increases:

- PC (cash payers only) and CV toll increases in 2005
- PC toll rate increase in 2012
- A three-phase CV toll rate increase between 2015 and 2017
- Inflation-based annual CV toll rate beginning increases in 2018

In 2019, toll revenue increased 3.0 percent to a record high of $1.38 billion. In 2020, toll revenues fell approximately 17.1 percent, to $1.1 billion, due to the impacts of the COVID-19 pandemic.

2.2 Recent Performance Trends

Between 2016 and 2019, the average annual increase in transactions was 3.2 percent. This growth can be attributed to regional and national economic expansion, the opening of the IL 390 Tollway in 2016, the completion of widening the Jane Addams Memorial Tollway in December 2016, the opening of the IL 390 Tollway eastern extension in November 2017, and the opening of several new interchanges on I-90.

Over the same period, revenues increased at an average annual rate of 4.3 percent. The increase in revenues during this time exceeded that of transactions due to the 6.7-percent CV toll rate increase implemented in 2017 and the start of annual inflation-based CV toll rate increases in 2018.

Despite the toll rate increases, CV transactions grew at an average annual rate of 4.2 percent between 2016 and 2019. This growth attests to the relatively low elasticity of demand demonstrated by Tollway patrons. In comparison, PC transactions grew at an average annual rate of 3.0 percent for that same period.

In 2019, total transactions grew by 1.4 percent over 2018. PC transactions grew by 1.3 percent, while CV transactions grew by 2.2 percent. The lower PC growth can be attributed to several major construction projects that occurred on the Tollway in 2019. CV transactions were not as impacted by construction. The lower impact on CVs is, in part, because of a higher proportion of long-distance trips that diverted to other Tollway routes.

2.2.1 Trends by Facility

Annual revenues are presented by route in Table 2-3, while recent transactions on the five Illinois Tollway facilities and systemwide are presented in Table 2-4. As illustrated, trends of the different facilities have varied. Tables 2-5 through 2-10 present monthly transactions by facility.

Table 2-3. Illinois Tollway Revenue by Route, 2016–2020 (in thousands)[a]

Illinois Tollway Route	2016[b]	% Change	2017[c]	% Change	2018[d]	% Change	2019[d]	% Change	2020[d]
Jane Addams Memorial	$224,423	15.2%	$258,433	8.6%	$280,736	3.3%	$290,057	-13.9%	$249,692
Tri-State	564,780	5.6%	596,569	2.3%	610,289	1.4%	618,877	-17.0%	513,815
Reagan Memorial	193,505	2.9%	199,192	-6.9%	185,530	5.4%	195,522	-17.1%	162,043
Veterans Memorial	220,902	3.6%	228,873	-0.3%	228,236	4.3%	238,006	-19.3%	191,990
Illinois Route 390	11,323	118.1%	24,699	41.2%	34,873	5.2%	36,701	-18.5%	29,904

[a] Collected revenue. Does not include oversized/overweight vehicle revenues.
[b] Tolling on the western portion of IL 390 began on July 5, 2016.
[c] Tolling on the eastern extension of IL 390 began on November 1, 2017.
[d] CV toll rates increased by 1.84 percent in 2018, 2.25 percent in 2019, and 2.07 percent in 2020.

Table 2-4. Illinois Tollway Transactions by Route, 2016–2020 (in thousands)

Illinois Tollway Route	2016[a]	% Change	2017[b]	% Change	2018	% Change	2019	% Change	2020
Jane Addams Memorial	171,409	16.2%	199,238	6.9%	212,899	3.5%	220,352	-17.7%	181,317
Tri-State	412,384	1.1%	416,990	-1.0%	412,811	-0.5%	410,803	-22.6%	317,842
Reagan Memorial	152,910	0.8%	154,068	-6.0%	144,897	1.1%	146,491	-23.3%	112,328
Veterans Memorial	169,587	1.5%	172,168	-6.1%	161,593	2.3%	165,274	-20.4%	131,573
Illinois Route 390	25,601	114.3%	54,870	39.9%	76,752	4.6%	80,301	-20.8%	63,590

[a] Tolling on the western portion of IL 390 began on July 5, 2016.
[b] Tolling on the eastern extension of IL 390 began on November 1, 2017.

Table 2-5. Jane Addams Memorial Monthly Transactions (thousands)[a]

Passenger Cars	2016	% change	2017	% change	2018	% change	2019	% change	2020	% change	2021
January	11,256	10.8%	12,476	12.7%	14,055	-2.9%	13,644	9.3%	14,915	-21.2%	11,757
February	11,036	9.7%	12,107	5.4%	12,758	7.1%	13,661	7.7%	14,713	-23.7%	11,228
March	12,347	12.7%	13,917	11.1%	15,462	4.2%	16,107	-26.2%	11,879	19.6%	14,208
April	12,185	15.3%	14,043	8.5%	15,230	5.1%	16,007	-53.4%	7,461	100.2%	14,938
May	13,010	15.4%	15,017	10.2%	16,557	3.4%	17,128	-39.7%	10,333	57.7%	16,294
June	13,125	17.9%	15,480	8.3%	16,761	3.1%	17,274	-23.7%	13,177	26.7%	16,689
July	13,921	15.9%	16,137	7.0%	17,267	3.3%	17,839	-15.0%	15,169	17.4%	17,810
August	13,739	19.1%	16,366	6.2%	17,387	3.9%	18,063	-16.3%	15,124	14.8%	17,367
September	12,784	21.7%	15,560	2.3%	15,924	3.6%	16,492	-13.2%	14,309	14.0%	16,306
October	12,912	22.7%	15,844	4.2%	16,506	4.4%	17,237	-15.7%	14,525		
November	12,316	21.2%	14,923	1.3%	15,122	4.4%	15,789	-22.9%	12,175		
December	12,426	19.8%	14,890	4.5%	15,556	4.9%	16,321	-22.3%	12,680		
Total	**151,058**	**17.0%**	**176,760**	**6.7%**	**188,584**	**3.7%**	**195,560**	**-20.0%**	**156,459**	**16.7%[b]**	**136,598**
Commercial Vehicles	**2016**	**% change**	**2017**	**% change**	**2018**	**% change**	**2019**	**% change**	**2020**	**% change**	**2021**
January	1,455	9.8%	1,598	12.1%	1,791	1.5%	1,817	6.5%	1,936	0.3%	1,941
February	1,487	3.6%	1,541	8.6%	1,674	6.7%	1,785	1.7%	1,816	0.9%	1,833
March	1,678	8.4%	1,819	7.1%	1,948	1.8%	1,983	-0.2%	1,980	15.4%	2,284
April	1,654	6.3%	1,758	11.8%	1,965	5.5%	2,074	-13.6%	1,791	25.7%	2,251
May	1,752	11.6%	1,956	12.9%	2,208	-0.7%	2,193	-11.9%	1,931	17.6%	2,271
June	1,838	9.7%	2,016	8.4%	2,185	-1.9%	2,143	1.1%	2,166	11.6%	2,418
July	1,739	11.2%	1,934	13.1%	2,187	0.5%	2,198	4.2%	2,291	2.2%	2,341
August	1,883	14.8%	2,162	5.8%	2,287	-1.3%	2,258	0.5%	2,270	5.9%	2,405
September	1,774	11.6%	1,979	2.3%	2,026	5.9%	2,145	5.4%	2,260	3.3%	2,334
October	1,797	14.4%	2,057	9.3%	2,247	3.1%	2,316	0.7%	2,333		
November	1,694	13.0%	1,914	4.0%	1,991	0.1%	1,994	3.2%	2,058		
December	1,599	9.1%	1,744	3.5%	1,806	4.5%	1,886	7.4%	2,026		
Total	**20,351**	**10.5%**	**22,478**	**8.2%**	**24,314**	**2.0%**	**24,793**	**0.3%**	**24,857**	**8.9%[b]**	**20,078**
All Vehicles Total	**171,409**	**16.2%**	**199,238**	**6.9%**	**212,899**	**3.5%**	**220,352**	**-17.7%**	**181,317**	**15.6%[b]**	**156,676**

[a] Numbers may not add due to rounding.

[b] Year-to-Date

Table 2-6. Tri-State Monthly Transactions (thousands)[a]

Passenger Cars	2016	% change	2017	% change	2018	% change	2019	% change	2020	% change	2021
January	25,850	3.8%	26,830	-1.4%	26,446	-7.4%	24,478	6.1%	25,970	-25.9%	19,239
February	25,518	0.6%	25,661	-6.4%	24,012	2.6%	24,643	3.2%	25,421	-28.2%	18,256
March	29,139	1.3%	29,519	0.4%	29,640	-1.0%	29,350	-30.9%	20,269	17.1%	23,736
April	28,844	1.8%	29,358	-0.9%	29,103	-1.1%	28,792	-58.8%	11,864	106.3%	24,470
May	31,148	1.4%	31,581	-0.3%	31,499	-1.8%	30,946	-46.8%	16,466	62.2%	26,704
June	31,286	1.5%	31,741	-0.7%	31,522	-2.1%	30,848	-31.1%	21,268	26.9%	26,996
July	32,453	-0.9%	32,149	-1.1%	31,809	0.2%	31,868	-24.0%	24,214	20.5%	29,183
August	32,098	0.8%	32,345	-1.6%	31,812	0.4%	31,943	-24.4%	24,149	17.4%	28,353
September	30,078	0.5%	30,236	-3.9%	29,066	-0.1%	29,026	-20.4%	23,093	16.1%	26,820
October	30,895	-0.5%	30,743	-2.2%	30,072	1.2%	30,428	-22.5%	23,572		
November	28,916	0.1%	28,955	-3.8%	27,855	-0.4%	27,745	-28.3%	19,892		
December	27,746	1.9%	28,276	-0.9%	28,019	1.4%	28,418	-26.8%	20,812		
Total	**353,972**	**1.0%**	**357,393**	**-1.8%**	**350,854**	**-0.7%**	**348,484**	**-26.3%**	**256,991**	**16.1%[b]**	**223,758**
Commercial Vehicles	**2016**	**% change**	**2017**	**% change**	**2018**	**% change**	**2019**	**% change**	**2020**	**% change**	**2021**
January	4,284	7.2%	4,594	3.7%	4,765	1.1%	4,817	3.4%	4,979	-0.2%	4,969
February	4,368	-0.4%	4,352	1.7%	4,427	6.7%	4,723	-2.1%	4,625	0.9%	4,665
March	4,917	3.1%	5,070	2.2%	5,179	-0.4%	5,159	-3.6%	4,973	16.1%	5,774
April	4,827	-1.4%	4,758	6.2%	5,053	3.8%	5,244	-17.7%	4,315	26.4%	5,453
May	5,000	5.2%	5,260	4.9%	5,516	-1.1%	5,455	-16.5%	4,557	18.5%	5,399
June	5,174	1.7%	5,261	2.5%	5,394	-3.0%	5,230	-1.5%	5,150	7.8%	5,554
July	4,835	0.7%	4,868	9.2%	5,316	1.5%	5,395	-1.4%	5,321	2.4%	5,446
August	5,288	2.7%	5,433	3.9%	5,644	-1.8%	5,542	-2.9%	5,384	3.9%	5,596
September	5,008	-0.2%	4,999	1.5%	5,077	2.8%	5,221	4.3%	5,447	1.3%	5,516
October	5,095	3.8%	5,290	7.2%	5,673	0.3%	5,691	1.4%	5,773		
November	4,906	2.4%	5,022	1.7%	5,108	-2.3%	4,989	2.5%	5,115		
December	4,710	-0.4%	4,690	2.5%	4,805	1.0%	4,855	7.3%	5,211		
Total	**58,412**	**2.0%**	**59,597**	**4.0%**	**61,957**	**0.6%**	**62,319**	**-2.4%**	**60,851**	**8.1%[b]**	**48,371**
All Vehicles Total	**412,384**	**1.1%**	**416,990**	**-1.0%**	**412,811**	**-0.5%**	**410,803**	**-22.6%**	**317,842**	**14.6%[b]**	**272,129**

[a] Numbers may not add due to rounding.

[b] Year-to-Date

Table 2-7. Reagan Memorial Monthly Transactions (thousands)[a]

Passenger Cars	2016	% change	2017	% change	2018	% change	2019	% change	2020	% change	2021
January	10,577	1.2%	10,700	-0.7%	10,629	-10.8%	9,476	9.1%	10,341	-27.8%	7,461
February	10,500	-1.7%	10,316	-6.4%	9,659	0.0%	9,661	5.2%	10,162	-29.1%	7,203
March	11,771	-0.7%	11,689	0.5%	11,742	-4.3%	11,235	-29.4%	7,935	17.5%	9,326
April	11,521	0.1%	11,531	-2.7%	11,218	-1.8%	11,021	-59.4%	4,477	114.6%	9,606
May	12,225	2.0%	12,467	-5.5%	11,777	0.0%	11,777	-49.0%	6,012	75.4%	10,544
June	11,973	2.2%	12,242	-6.7%	11,421	1.1%	11,550	-32.1%	7,838	36.6%	10,710
July	12,032	1.5%	12,207	-6.9%	11,367	3.6%	11,773	-23.0%	9,066	23.8%	11,228
August	12,235	2.8%	12,582	-8.7%	11,481	4.6%	12,015	-22.8%	9,276	20.7%	11,193
September	11,767	1.3%	11,924	-10.2%	10,708	4.2%	11,157	-19.6%	8,969	20.4%	10,801
October	12,152	-0.2%	12,124	-7.4%	11,227	5.1%	11,797	-21.7%	9,240		
November	11,494	0.2%	11,513	-9.0%	10,479	3.7%	10,866	-28.8%	7,737		
December	11,164	2.7%	11,466	-4.9%	10,900	3.7%	11,298	-27.3%	8,213		
Total	**139,412**	**1.0%**	**140,760**	**-5.8%**	**132,607**	**0.8%**	**133,627**	**-25.7%**	**99,264**	**18.9%[b]**	**88,072**
Commercial Vehicles	**2016**	**% change**	**2017**	**% change**	**2018**	**% change**	**2019**	**% change**	**2020**	**% change**	**2021**
January	975	2.3%	998	2.5%	1,023	-10.5%	916	12.3%	1,029	-0.2%	1,027
February	1,002	-6.3%	939	1.0%	948	-2.8%	921	4.1%	959	1.1%	969
March	1,139	-2.9%	1,106	-0.5%	1,101	-9.1%	1,001	3.8%	1,039	15.5%	1,200
April	1,127	-7.4%	1,044	-3.2%	1,010	4.8%	1,058	-11.1%	941	27.4%	1,199
May	1,163	1.1%	1,176	-7.4%	1,090	2.4%	1,116	-11.1%	992	21.8%	1,208
June	1,221	-1.2%	1,207	-12.3%	1,058	2.5%	1,085	4.0%	1,128	13.6%	1,282
July	1,124	-0.3%	1,121	-7.2%	1,040	9.5%	1,139	3.8%	1,182	5.9%	1,251
August	1,208	3.8%	1,255	-13.0%	1,092	9.5%	1,196	-2.1%	1,171	10.5%	1,294
September	1,165	-1.8%	1,144	-15.5%	967	15.9%	1,120	4.6%	1,172	9.2%	1,279
October	1,187	0.3%	1,191	-8.2%	1,093	13.0%	1,235	1.7%	1,255		
November	1,134	-2.1%	1,110	-12.4%	972	9.3%	1,062	3.8%	1,103		
December	1,052	-3.1%	1,019	-12.1%	896	13.5%	1,016	7.5%	1,093		
Total	**13,498**	**-1.4%**	**13,309**	**-7.7%**	**12,290**	**4.7%**	**12,864**	**1.6%**	**13,064**	**11.4%[b]**	**10,709**
All Vehicles Total	**152,910**	**0.8%**	**154,068**	**-6.0%**	**144,897**	**1.1%**	**146,491**	**-23.3%**	**112,328**	**18.0%[b]**	**98,781**

[a] Numbers may not add due to rounding.

[b] Year-to-Date

Table 2-8. Veterans Memorial Monthly Transactions (thousands)[a]

Passenger Cars	2016	% change	2017	% change	2018	% change	2019	% change	2020	% change	2021
January	11,859	1.3%	12,009	-0.5%	11,953	-12.7%	10,435	12.4%	11,724	-24.3%	8,870
February	11,717	-1.8%	11,501	-5.3%	10,887	-1.7%	10,705	6.3%	11,380	-24.2%	8,625
March	13,047	0.1%	13,054	-0.4%	13,003	-5.9%	12,238	-25.9%	9,066	19.6%	10,839
April	12,857	0.5%	12,918	-0.5%	12,853	-3.4%	12,414	-55.0%	5,580	102.5%	11,300
May	13,586	2.3%	13,896	-2.1%	13,605	-2.4%	13,283	-44.2%	7,406	64.8%	12,208
June	13,637	2.8%	14,014	-7.2%	13,005	1.3%	13,176	-27.0%	9,624	30.8%	12,587
July	13,500	1.8%	13,746	-7.9%	12,657	5.9%	13,410	-19.1%	10,849	19.5%	12,970
August	13,732	3.2%	14,173	-11.3%	12,566	8.7%	13,657	-19.4%	11,007	17.8%	12,965
September	13,047	2.4%	13,358	-13.8%	11,521	9.8%	12,649	-15.8%	10,651	17.6%	12,528
October	13,368	1.4%	13,559	-8.6%	12,395	9.3%	13,549	-18.9%	10,984		
November	12,647	1.3%	12,815	-11.8%	11,305	8.6%	12,281	-25.4%	9,160		
December	12,533	1.5%	12,724	-8.4%	11,659	8.0%	12,596	-23.4%	9,650		
Total	**155,531**	**1.4%**	**157,766**	**-6.6%**	**147,410**	**2.0%**	**150,393**	**-22.1%**	**117,083**	**17.9%[b]**	**102,892**
Commercial Vehicles	**2016**	**% change**	**2017**	**% change**	**2018**	**% change**	**2019**	**% change**	**2020**	**% change**	**2021**
January	986	5.9%	1,045	6.2%	1,109	-6.6%	1,036	9.9%	1,138	-1.8%	1,118
February	1,009	-1.8%	991	3.0%	1,021	1.6%	1,037	1.2%	1,049	0.8%	1,057
March	1,129	2.4%	1,157	2.8%	1,189	-6.4%	1,113	0.4%	1,117	17.6%	1,314
April	1,152	-2.8%	1,120	7.0%	1,198	2.1%	1,223	-15.7%	1,031	31.9%	1,360
May	1,221	5.3%	1,286	3.3%	1,328	0.9%	1,340	-18.3%	1,095	26.2%	1,382
June	1,286	3.6%	1,332	-4.2%	1,276	1.2%	1,292	-1.6%	1,272	19.3%	1,518
July	1,201	1.8%	1,222	1.2%	1,236	10.7%	1,369	-2.2%	1,340	10.4%	1,479
August	1,298	5.3%	1,367	-7.6%	1,263	10.5%	1,395	-5.7%	1,315	15.2%	1,515
September	1,231	0.7%	1,240	-8.9%	1,129	12.6%	1,272	3.1%	1,311	13.4%	1,486
October	1,244	4.6%	1,302	-1.4%	1,284	10.7%	1,420	-2.2%	1,389		
November	1,189	3.3%	1,228	-7.5%	1,136	7.9%	1,226	-0.1%	1,225		
December	1,110	0.3%	1,113	-9.0%	1,013	14.2%	1,157	4.3%	1,206		
Total	**14,056**	**2.5%**	**14,402**	**-1.5%**	**14,183**	**4.9%**	**14,881**	**-2.6%**	**14,490**	**14.6%[b]**	**12,229**
All Vehicles Total	**169,587**	**1.5%**	**172,168**	**-6.1%**	**161,593**	**2.3%**	**165,274**	**-20.4%**	**131,573**	**17.5%[b]**	**115,121**

[a] Numbers may not add due to rounding.

[b] Year-to-Date

Table 2-9. IL 390 Monthly Transactions (thousands)[a]

Passenger Cars	2016	% change	2017	% change	2018	% change	2019	% change	2020	% change	2021
January			3,698	44.3%	5,335	-0.7%	5,300	7.7%	5,706	-25.7%	4,239
February			3,446	43.0%	4,927	7.1%	5,277	4.3%	5,505	-24.2%	4,174
March			3,874	49.8%	5,803	1.8%	5,909	-22.4%	4,587	10.7%	5,079
April			3,817	49.0%	5,688	5.3%	5,992	-48.1%	3,107	66.7%	5,180
May			4,155	49.2%	6,200	3.7%	6,428	-42.1%	3,718	46.8%	5,459
June			4,185	45.7%	6,099	3.4%	6,308	-27.2%	4,593	23.2%	5,659
July	3,598	14.1%	4,106	47.5%	6,055	7.4%	6,500	-22.0%	5,071	13.2%	5,741
August	4,200	4.0%	4,366	44.1%	6,292	4.8%	6,597	-23.0%	5,079	14.0%	5,792
September	3,994	2.3%	4,087	40.5%	5,741	5.8%	6,076	-18.8%	4,936	13.3%	5,591
October	4,151	0.7%	4,179	49.3%	6,238	4.7%	6,532	-21.2%	5,148		
November	3,896	40.0%	5,453	4.4%	5,691	3.7%	5,901	-26.9%	4,315		
December	3,830	41.6%	5,424	4.3%	5,659	4.7%	5,924	-24.1%	4,499		
Total	**23,669**	**114.6%**	**50,790**	**37.3%**	**69,727**	**4.3%**	**72,745**	**-22.7%**	**56,267**	**10.9%[b]**	**46,913**
Commercial Vehicles	**2016**	**% change**	**2017**	**% change**	**2018**	**% change**	**2019**	**% change**	**2020**	**% change**	**2021**
January			246	108.5%	513	5.5%	541	7.0%	579	-6.8%	540
February			236	104.1%	482	9.6%	528	-0.5%	526	-0.5%	523
March			285	97.6%	562	0.3%	564	-0.2%	563	15.1%	648
April			280	104.0%	571	6.6%	609	-13.8%	525	25.1%	656
May			326	93.2%	630	4.6%	659	-16.9%	548	19.9%	657
June			339	83.7%	623	1.6%	633	0.9%	639	14.2%	729
July	307	1.3%	311	98.2%	617	13.5%	700	-1.9%	687	5.3%	724
August	358	-0.1%	358	82.3%	653	10.0%	718	-7.2%	667	9.8%	732
September	337	-4.0%	323	83.4%	593	10.6%	656	1.7%	667	8.2%	721
October	346	-4.8%	329	104.0%	672	13.2%	761	-4.8%	725		
November	314	73.5%	545	7.4%	585	4.7%	613	-1.5%	604		
December	269	86.3%	502	4.4%	524	9.7%	575	3.7%	596		
Total	**1,932**	**111.2%**	**4,080**	**72.1%**	**7,024**	**7.6%**	**7,557**	**-3.1%**	**7,323**	**9.8%[b]**	**5,930**
All Vehicles Total	**25,601**	**114.3%**	**54,870**	**39.9%**	**76,752**	**4.6%**	**80,301**	**-20.8%**	**63,590**	**10.8%[b]**	**52,843**

[a] Numbers may not add due to rounding.

[b] Year-to-Date

Table 2-10. Systemwide Monthly Transactions (thousands)[a]

Passenger Cars	2016	% change	2017	% change	2018	% change	2019	% change	2020	% change	2021
January	59,543	10.4%	65,713	4.1%	68,418	-7.4%	63,333	8.4%	68,656	-24.9%	51,566
February	58,772	7.2%	63,031	-1.2%	62,244	2.7%	63,946	5.1%	67,181	-26.3%	49,486
March	66,304	8.7%	72,052	5.0%	75,651	-1.1%	74,839	-28.2%	53,736	17.6%	63,188
April	65,407	9.6%	71,666	3.4%	74,092	0.2%	74,227	-56.2%	32,489	101.6%	65,495
May	69,970	10.2%	77,116	3.3%	79,637	-0.1%	79,561	-44.8%	43,936	62.1%	71,209
June	70,021	10.9%	77,662	1.5%	78,808	0.4%	79,156	-28.6%	56,501	28.6%	72,642
July	75,504	3.8%	78,345	1.0%	79,155	2.8%	81,390	-20.9%	64,371	19.5%	76,932
August	76,005	5.0%	79,831	-0.4%	79,538	3.4%	82,275	-21.4%	64,634	17.1%	75,670
September	71,670	4.9%	75,165	-2.9%	72,959	3.3%	75,401	-17.8%	61,959	16.3%	72,046
October	73,479	4.0%	76,449	0.0%	76,438	4.1%	79,543	-20.2%	63,470		
November	69,269	6.3%	73,658	-4.4%	70,452	3.0%	72,582	-26.6%	53,279		
December	67,699	7.5%	72,780	-1.4%	71,793	3.8%	74,555	-25.1%	55,854		
Total	**823,643**	**7.3%**	**883,468**	**0.6%**	**889,184**	**1.3%**	**900,808**	**-23.8%**	**686,065**	**16.5%[b]**	**598,233**
Commercial Vehicles	**2016**	**% change**	**2017**	**% change**	**2018**	**% change**	**2019**	**% change**	**2020**	**% change**	**2021**
January	7,701	10.1%	8,481	8.5%	9,202	-0.8%	9,127	5.9%	9,661	-0.7%	9,594
February	7,866	2.5%	8,059	6.1%	8,552	5.2%	8,995	-0.2%	8,975	0.8%	9,048
March	8,864	6.4%	9,435	5.8%	9,980	-1.6%	9,820	-1.5%	9,672	16.0%	11,220
April	8,760	2.3%	8,959	9.4%	9,797	4.2%	10,207	-15.7%	8,603	26.9%	10,918
May	9,136	9.5%	10,004	7.7%	10,771	-0.1%	10,763	-15.2%	9,123	19.7%	10,917
June	9,519	6.7%	10,155	3.8%	10,537	-1.5%	10,382	-0.3%	10,355	11.1%	11,500
July	9,206	2.7%	9,457	9.9%	10,397	3.9%	10,801	0.2%	10,820	3.9%	11,241
August	10,035	5.4%	10,575	3.4%	10,939	1.6%	11,110	-2.7%	10,808	6.8%	11,542
September	9,515	1.8%	9,686	1.1%	9,791	6.3%	10,413	4.3%	10,857	4.4%	11,337
October	9,670	5.2%	10,168	7.9%	10,968	4.2%	11,424	0.4%	11,475		
November	9,237	6.3%	9,819	-0.3%	9,792	0.9%	9,883	2.2%	10,105		
December	8,739	3.8%	9,068	-0.3%	9,043	4.9%	9,489	6.8%	10,132		
Total	**108,248**	**5.2%**	**113,866**	**5.2%**	**119,768**	**2.2%**	**122,413**	**-1.5%**	**120,584**	**9.5%[b]**	**97,317**
All Vehicles Total	**931,891**	**7.0%**	**997,334**	**1.2%**	**1,008,952**	**1.4%**	**1,023,220**	**-21.2%**	**806,650**	**15.5%[b]**	**695,551**

[a] Numbers may not add due to rounding.

[b] Year-to-Date

The Jane Addams Memorial Tollway (I-90) has experienced the highest recent growth of the four established Tollway routes. Prior to 2013, growth on this route had slowed because of capacity constraints and the limited ability to absorb new traffic. In 2013, major reconstruction and widening work began, which further reduced facility capacity and decreased transactions. The widening and reconstruction work was completed in December 2016 and was followed by significant revenue growth: an annual increase of 15.2 percent in 2017 and 8.6 percent in 2018.

The Tri-State Tollway (I-94/I-294/I-80) has remained the highest volume route since the Illinois Tollway opened. Although initially intended as a bypass of the Chicago metropolitan area, the Tri-State has since become a commuter route for traffic to and from the city of Chicago, as well as between suburbs. As development around the corridor has matured, traffic volumes have stabilized. In addition to serving as a commuter route, the Tri-State also carries significant CV traffic. In 2018 and 2019, transactions on this route decreased as a result of significant construction impacts, including reconstruction and widening work on the Central Tri-State (I-294) and reconstruction work on the Edens Spur (I-94).

The Reagan Memorial Tollway (I-88) had experienced high overall growth prior to 2012, because of a rapidly increasing residential population in the western suburbs, including Naperville and Aurora, and employment along the "tech corridor" that flanks I-88. In recent years, that population growth has slowed and construction on both I-88 and the parallel Jane Addams Memorial Tollway (I-90) has contributed to variations in traffic on this route. In 2014, CV traffic on I-88 increased significantly due to long-haul trucks diverting from the reconstruction and widening work on I-90. Between 2014 and 2017, that traffic returned to I-90 while various rehabilitation and resurfacing projects were implemented on I-88. In 2018 and 2019, traffic was further impacted by construction-related lane closures on a large portion of the western section and major reconstruction work between York Road and I-290.

The Veterans Memorial Tollway (I-355) is used by many suburb-to-suburb commuters and directly connects four major interstate highways: I-80, I-55, I-88, and I-290. Since the completion of the south extension in 2007, I-355 has added an additional interstate route from I-80 to I-90. This has attracted some long-haul truckers looking to bypass more congested areas of the region. The I-355 south extension also connects to areas of Will County that are still being developed. Some of the more recent transactions and revenue growth is a result of development at the south end of the route. Most recently, in 2019, traffic on this route was dampened by major widening work between Roosevelt Road (IL 38) and Butterfield Road (IL 56).

Tolling began on the IL 390 Tollway between Lake Street and Rohlwing Road on July 5, 2016, contributing to year-over-year new revenues in the second half of 2016 and the first half of 2017. The east extension of IL 390 Tollway between Rohlwing Road and Busse Road (Illinois Route 83) opened on November 1, 2017, contributing additional year-over-year revenue to the system in the last two months of 2017 and the first 10 months of 2018.

2.2.2 COVID-19 Impacts

In 2020, transactions were down 21.2 percent compared with 2019. Starting in mid-March, traffic volumes on the Illinois Tollway and throughout the United States decreased significantly as a result of social distancing measures adopted in response to the COVID-19 pandemic. In Illinois, social distancing measures include the Governor's stay-at-home order first issued on March 20, 2020, and widespread school and workplace closures. Figure 2-2 presents 2019, 2020, and 2021 (year-to-date) transaction trends by week.

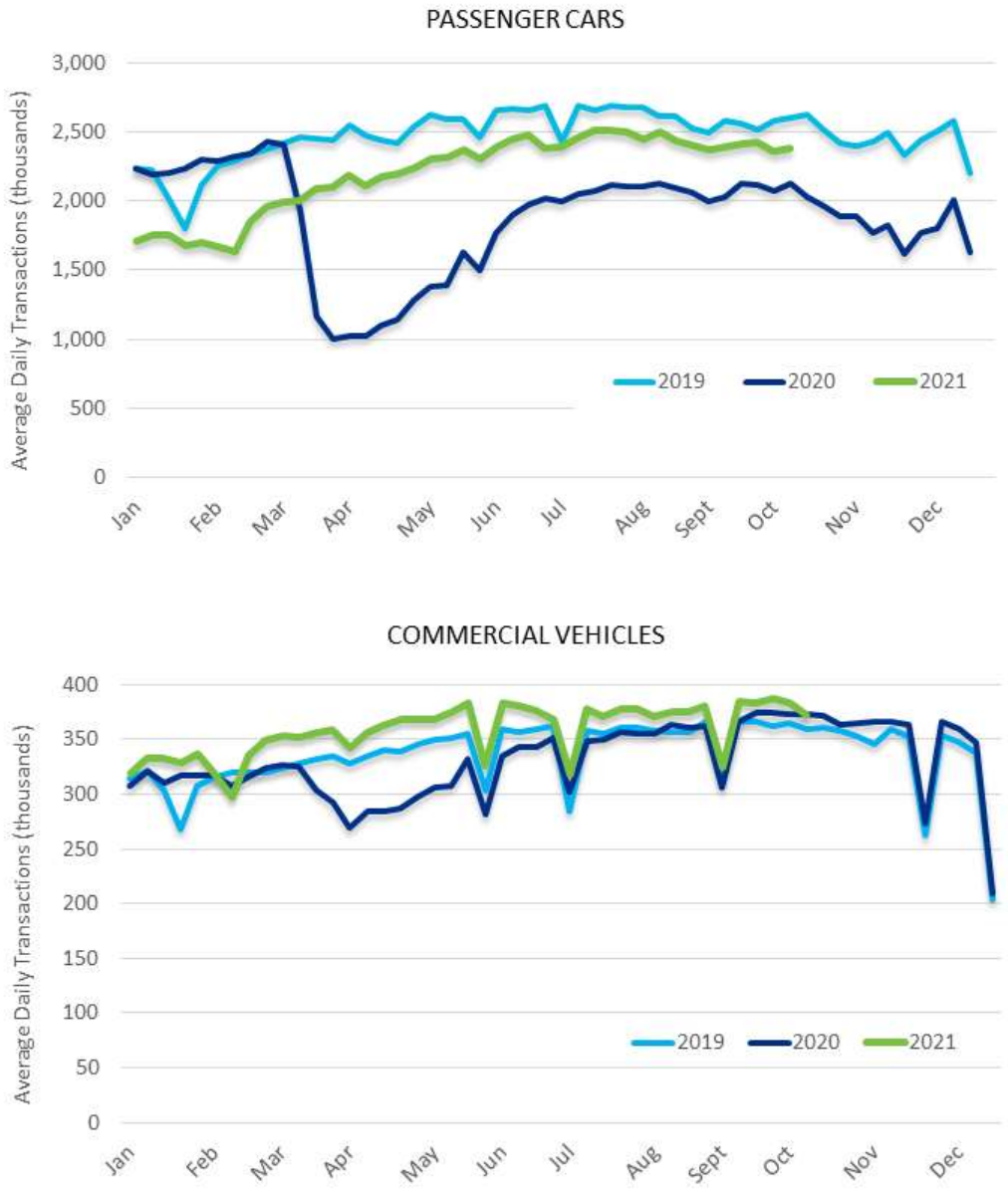


Figure 2-2. Passenger Car and Commercial Vehicle Transaction Performance (2019–2021)

In the first two months of 2020, transactions grew by 6.2 percent compared with 2019, due in part to a decrease in construction work and mild winter weather. From March through December 2020, however, transactions were 25.7 percent below 2019 transactions for the same period. Transaction losses were most significant in April and May when COVID-19-related closures were greatest throughout the state of Illinois. Between June and September, transaction volumes gradually increased from 25.3 to 15.1 percent below 2019 levels, as the state shifted from Phase 1 to Phase 4 of the Governor's Restore Illinois reopening plan. Recovery slowed in late fall 2020 as COVID-19 cases increased and mitigation measures under the Restore Illinois plan were implemented.

Recovery continued to be slow in early 2021, in part, because of the severe winter weather events in late January and February. Beginning in March, recovery continued, and transactions rose to 6.6 percent below 2019 levels in August.

The impact of the pandemic restrictions and closures has been most significant on PCs. From March through December 2020, PC transactions were 28.9 percent below the same period in 2019. In comparison, CV transactions were 2.2 percent below 2019 transactions for that period. CV performance rebounded quickly after peak declines in April and May. Between September and December 2020, CV performance exceeded 2019 levels. This pattern has continued into 2021, with CV transactions exceeding 2019 levels each month to date. While PC transactions in 2021 remain below 2019 levels, they have gradually increased over the year, rising to 8.0 percent below 2019 levels in August.

2.3 Traffic Profile

This section presents travel patterns by month, day, and hour on the Illinois Tollway. The Tollway is largely a commuter route. On a daily basis, the Tollway has a high percentage of PC trips that are made during the rush hour periods for work-related purposes. However, the Tollway also serves as a major connection for both interstate commerce and recreational interstate passenger traffic. As a result, the summer months are the busiest months of the year because recreational traffic and peak annual commercial traffic are added to the commuter base.

2.3.1 Monthly Variations

On the Tollway system, traffic volumes generally reach the highest levels during the summer months, as shown in Figure 2-3. Year-to-year variations in the number of weekdays in a given month, as well as the dates of holidays, explain slight variances in the overall pattern. For example, in 2019, September averaged fewer daily transactions than five other months, largely because of the Friday preceding Labor Day (a major travel day) falling in August, boosting its daily average transactions. Another factor in the winter months are weather events. If significant storms fall disproportionately within a single month, average daily transactions in that month may be affected. While January 2019 had three snow events, two of them fell on weekends, which diminished impacts. Similarly, the largest snowfall of the year occurred on an April Sunday. As a result, weather impacts on daily traffic in 2019 were minimal.

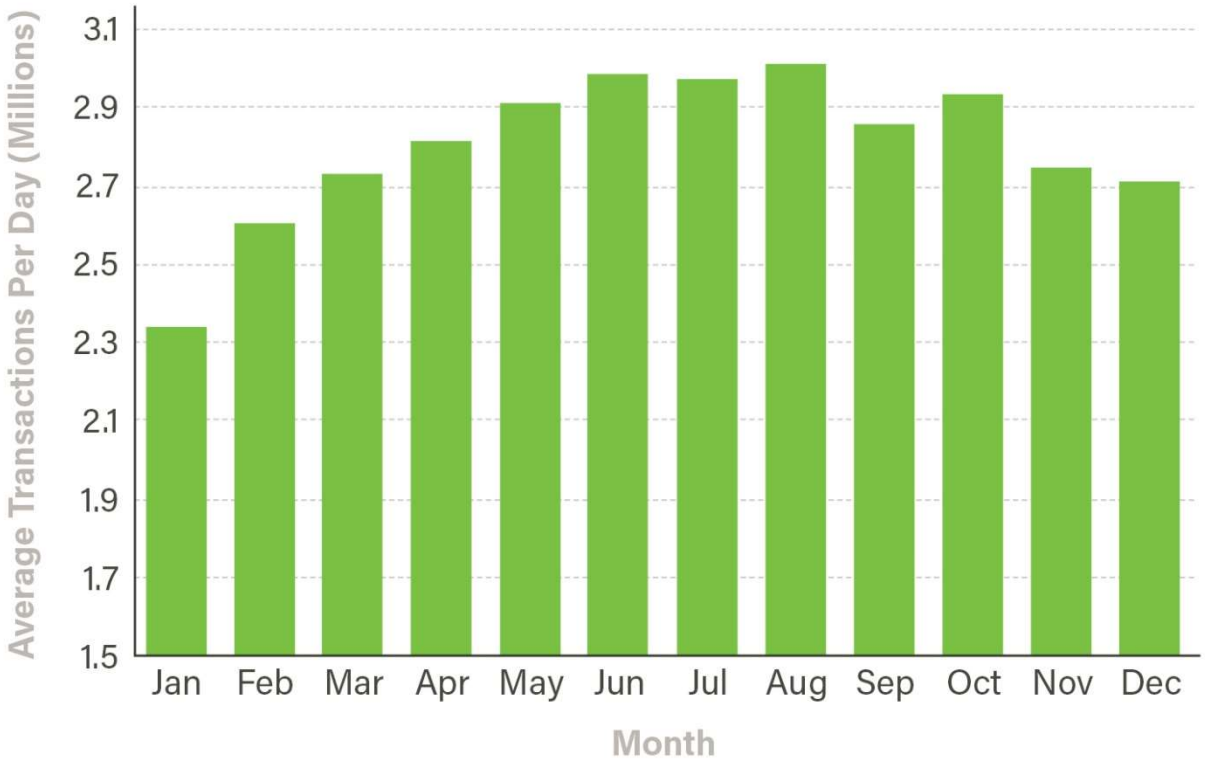


Figure 2-3. Average Daily Transactions by Month (2019)

Figure 2-4 shows the share of monthly transactions by PCs and CVs. PC transactions are highest in the summer months and lowest in the winter months. The summer months are highest because both commuters and vacationers use the system during this period. During the winter months, many commuters take off work for the holidays at the end of December and beginning of January. This reduces transactions during these months. Similar to PC transactions, CV transactions increase over the summer months. CV volumes remain high in the fall as shipping increases in preparation for the holiday season. Holidays tend to have a larger impact on CV traffic, resulting in dips in March/April, July, and August/September, due to the Easter, Fourth of July, and Labor Day holidays, respectively.

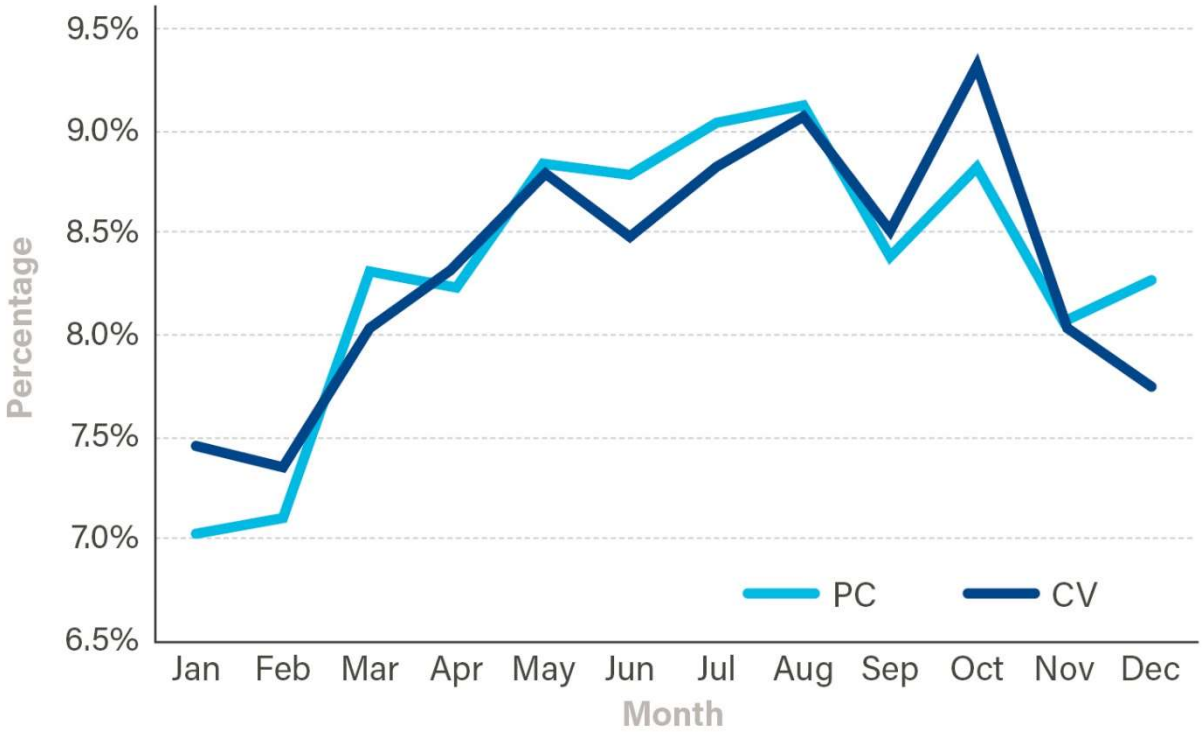


Figure 2-4. Passenger Car and Commercial Vehicle Transactions by Month (2019)

2.3.1.1 Urban and Rural Monthly Variations

The monthly variations in transactions are not uniform throughout the system. While there are localized variations between individual plazas, the most significant distinction is between urban versus rural toll plazas. The heaviest travel periods on the rural portions of the Tollway occur during the summer on Friday and Sunday afternoons, when Chicago-area residents are leaving for or returning from recreational travel. Otherwise, the traffic volumes and congestion levels on the rural sections of the Tollway are typically much lower than on the urban portions. As noted previously, the rural portions of roadway do not have the traditional high-volume, peak periods in the morning and afternoon as experienced by other parts of the system.

Figure 2-5 shows the difference between monthly traffic patterns at suburban and rural plazas. York Road Toll Plaza (Plaza 51) is an urban plaza used mostly by commuters. In contrast, South Beloit Toll Plaza (Plaza 1) is located at the rural edge of the Tollway and has a higher proportion of recreational trips. While transactions at both plazas peak during the summer months, South Beloit Toll Plaza has a large spike in trips between July and August, whereas York Road Toll Plaza's profile is relatively flat during this time.

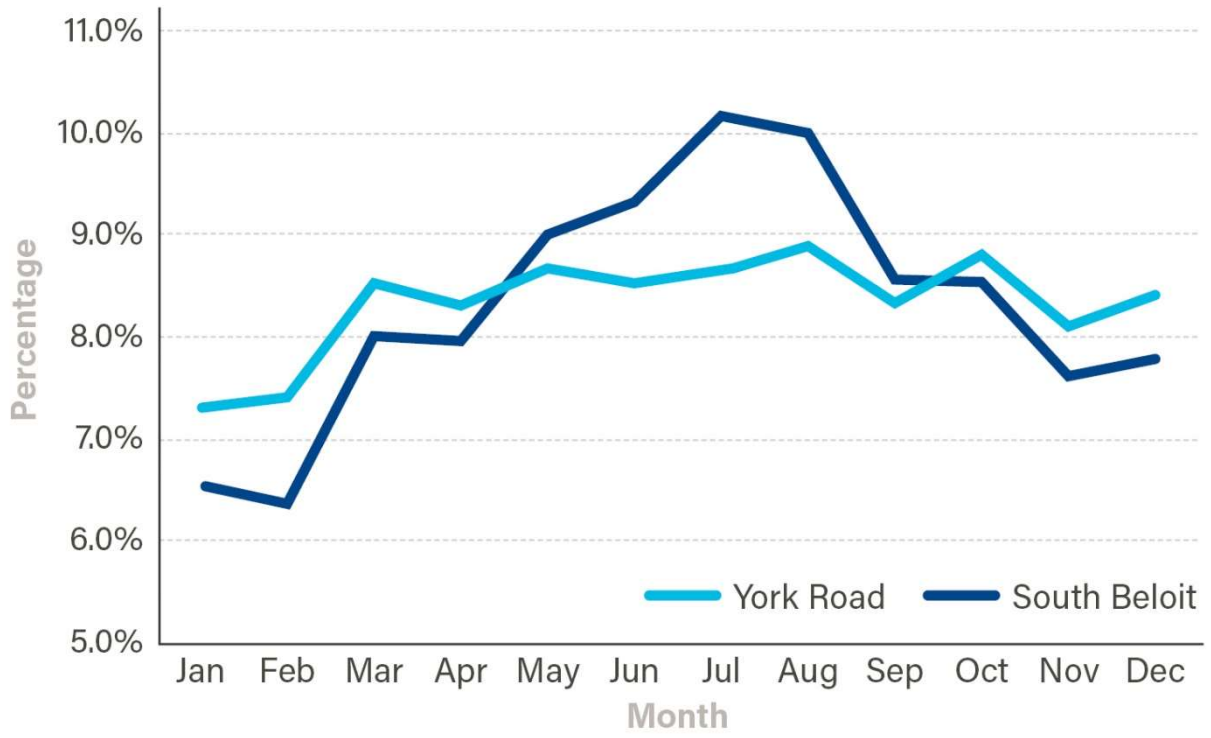


Figure 2-5. Monthly Transactions for Urban and Rural Plazas (2019)

2.3.2 Daily Variations

The overall number of transactions is higher on weekdays, which reflects consistent use by local commuters. As shown in Figure 2-6, transactions rise slowly over the week to peak on Fridays, when transactions include both weekday commuter trips and weekend recreational trips. During the summer months, many recreational travelers leave the Chicago region on Friday afternoon for vacation destinations in Wisconsin, Indiana, and Michigan. These summer Fridays commonly represent the highest transaction days on the Tollway system. On Saturdays and Sundays, the number of transactions decrease, due to fewer work-related trips on the weekend.

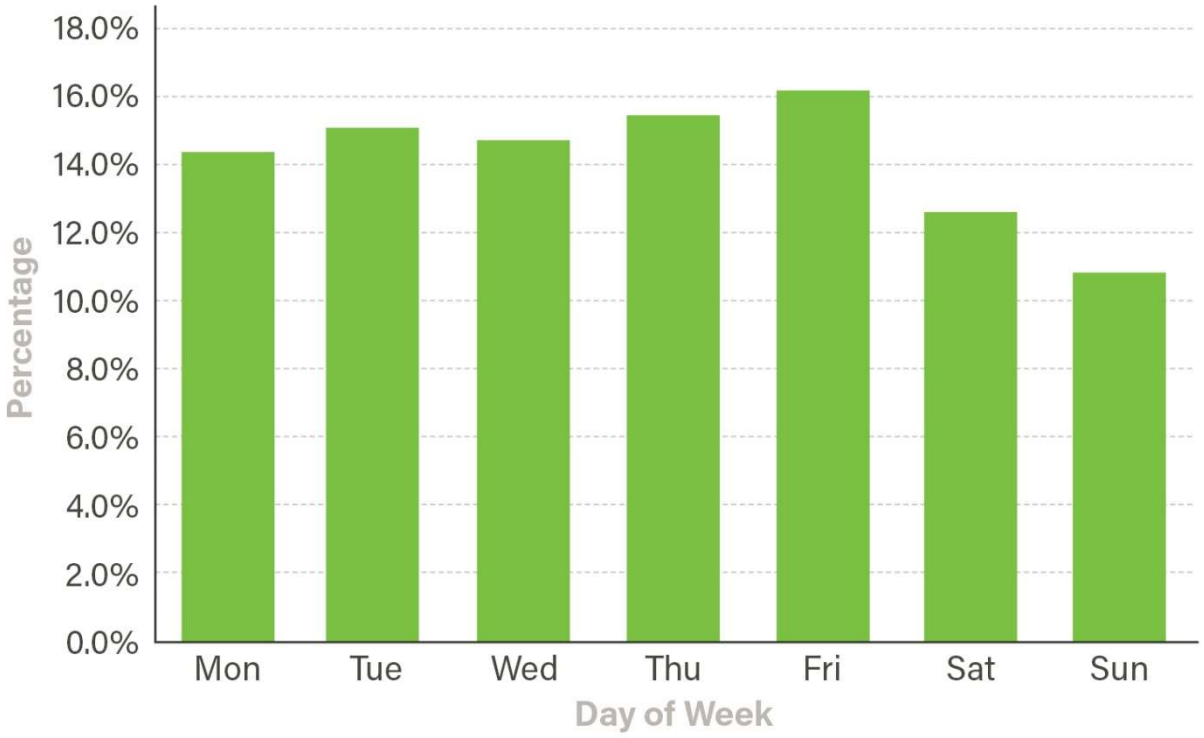


Figure 2-6. Daily Traffic Trends (2019)

2.3.3 Hourly Variations

The profile of traffic by hour of day varies widely throughout the system. Most of the suburban areas have distinct peak periods during the morning and evening rush hours. In contrast, rural areas show a mild morning peak period before volumes drop slightly, then slowly build until the evening peak period. At centrally located mainline toll plazas, such as Cermak Road Toll Plaza (Plaza 35), York Road Toll Plaza (Plaza 51), and Meyers Road Toll Plaza (Plaza 52), both peak periods have high-traffic volumes in both directions without any clear directional trend.

These patterns are illustrated in Figure 2-7. In the figure, rural mainline plazas are defined as South Beloit (Plaza 1), Belvidere (Plaza 5), and Marengo-Hampshire (Plaza 7) on the Jane Addams Memorial Tollway; Waukegan (Plaza 21) on the Tri-State Tollway; and DeKalb (Plaza 66) and Dixon (Plaza 69) on the Reagan Memorial Tollway.

Figure 2-7. Hourly Traffic Trends (2019)

Traffic by hour of day also varies among vehicle types. PCs, which make up the majority of the traffic on the Illinois Tollway, follow the peaking characteristics defined in Figure 2-7. Large truck profiles peak in late morning/early afternoon, with a gentle slope leading upward in the morning and downward in the evening. Large trucks have the highest proportion of overnight traffic, in part due to the off-peak toll discounts for CVs. Figure 2-8 shows large truck weekday hourly profiles compared with PCs for all mainline and attended plazas in 2019.

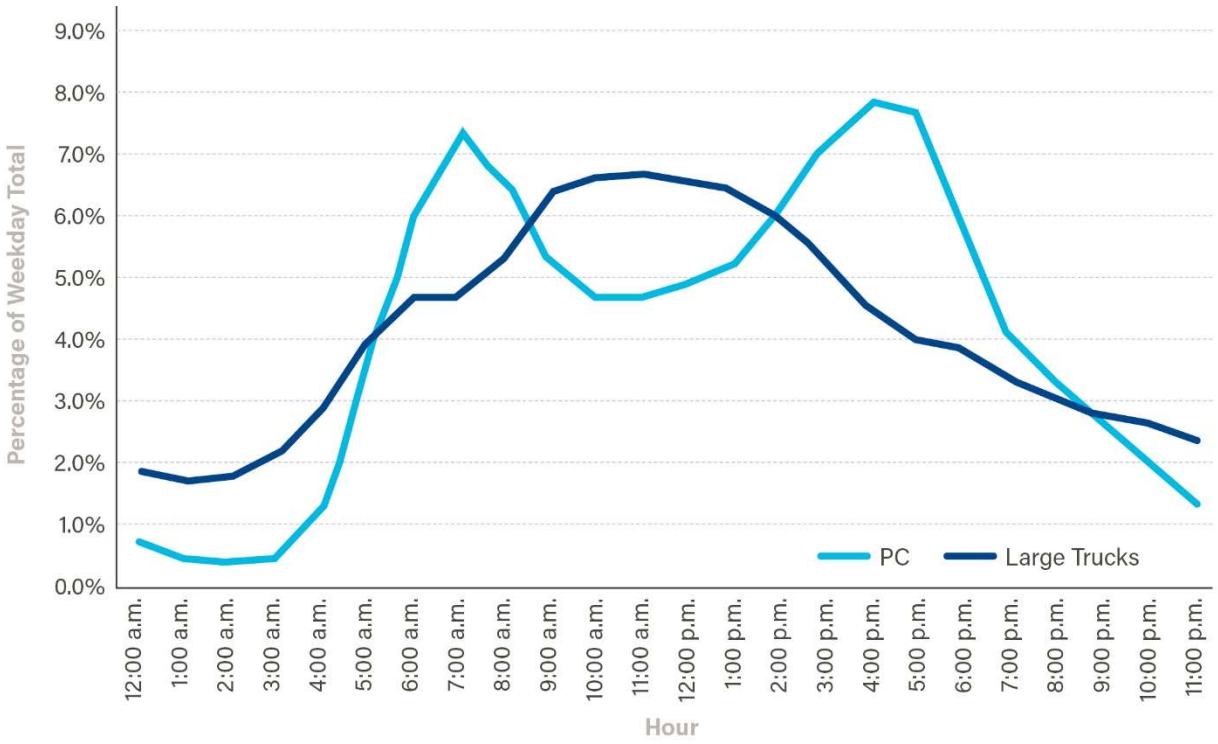


Figure 2-8. Passenger Car and Commercial Vehicle Hourly Trends (2019)

Small and medium truck profiles share similarities with the large truck and PC profiles. Medium trucks show an hourly profile similar to rural plazas, with a mild morning peak that builds toward a larger afternoon peak. Overnight medium truck traffic is noticeably lower than that of large trucks, but higher in proportion than PC volumes. Small trucks have a clear morning and afternoon peak, similar to PCs. However, as with medium trucks, the peaks occur closer to midday with volumes remaining high in between.

Chapter 3

Population & Economic Growth

3.1 Introduction

Regional socioeconomic characteristics are a principal driver of travel demand and have a significant impact on the ongoing usage of a toll facility. Population and employment are the two most important variables used in socioeconomic forecasts for transportation planning. From these socioeconomic variables and other travel-related model inputs, transportation planners forecast trip origins and destinations, trip distribution (linking origins and destinations), modal choice (auto, train, bus, walk), and trip assignment (specific route taken). The total of all trips assigned to Tollway routes provides the basis for revenue estimation. As such, it is therefore vital to review these underlying socioeconomic assumptions.

CDM Smith used a modified version of the Chicago Metropolitan Agency for Planning (CMAP) regional travel demand model as the basis for the study modeling effort. Inherent to the CMAP model are population and employment forecasts developed and adopted by CMAP. These socioeconomic forecasts are key in estimating future travel demand, and it is common practice at the investment-grade study level to independently verify and refine these assumptions. For this task, CDM Smith partnered with Dr. Kermit Wies, one of the region's foremost travel demand modeling experts, to prepare an independent socioeconomic forecast for the Illinois Tollway service area. Dr. Wies's full report is provided as Appendix B.

The socioeconomic forecast used throughout this study is from the independent forecast of Dr. Kermit Wies, senior research fellow and adjunct professor at Northwestern University Transportation Center. Chapter 4 details how this revised forecast was integrated into the modeling process. This chapter summarizes the demographic and economic information assembled from various sources, including Dr. Wies's findings.

3.2 Regional Development Trends

This section examines population and employment trends in the 11 Illinois counties directly served by the Illinois Tollway: Boone, Cook, DeKalb, DuPage, Kane, Lake, Lee, McHenry, Ogle, Will, and Winnebago.[3] Summary tables of historical population and employment growth trends are presented first, followed by historical regional personal income growth trends. Subregional development trends are described by groups of development trends by groups of counties: "core" counties (Cook, DuPage, and Lake), "collar" counties (DeKalb, Kane, McHenry, and Will), Rockford-area counties (Boone and Winnebago), and rural counties (Lee and Ogle). The section closes with a review of major regional employers and their proximity to the Tollway system.

---

[3] Occasionally, the Chicago Metropolitan Statistical Area (MSA) is used as a point of reference for various metrics. The MSA is defined by the U.S. Census Bureau and largely overlaps with the Tollway service area. It contains nine counties in Illinois (Cook, DeKalb, DuPage, Grundy, Lake, Kane, Kendall, McHenry, and Will), four counties in northwest Indiana (Jasper, Lake, Newton, and Porter), and one county in southeast Wisconsin (Kenosha).

3.2.1 Historical Population and Employment Growth Trends

Over the past four decades, the 11 counties served by the Illinois Tollway experienced population and employment growth. As shown in Table 3-1, population grew modestly in the 1980s, relatively fastest in the 1990s, modestly again in the 2000s, and declined slightly in the 2010s. Population growth has been moderately faster in the suburban counties of the Chicago metropolitan area, with DuPage, Lake, and McHenry Counties experiencing more growth in the earlier decades, while Kane and Will Counties experienced more population growth in the later decades. Urban counties like Cook and Winnebago, as well as rural counties Lee and Ogle, experienced low to negative growth over the past four decades.

Table 3-1. Historical Population Growth, 1980–2019

							Growth Rate[a]			
Subregion	County	1980	1990	2000	2010	2019	1980–1990	1990–2000	2000–2010	2010–2019
Rockford	Boone	28,630	30,806	41,788	54,165	53,544	0.7%	3.1%	2.6%	-0.1%
Core	Cook	5,253,628	5,105,044	5,376,741	5,194,675	5,150,233	-0.3%	0.5%	-0.3%	-0.1%
Collar	DeKalb	74,628	77,932	88,941	105,160	104,897	0.4%	1.3%	1.7%	0.0%
Core	DuPage	658,876	781,689	904,594	916,924	922,921	1.7%	1.5%	0.1%	0.1%
Collar	Kane	278,405	317,471	404,508	515,269	532,403	1.3%	2.5%	2.5%	0.4%
Core	Lake	440,387	516,418	644,682	703,462	696,535	1.6%	2.2%	0.9%	-0.1%
Rural	Lee	36,328	34,392	36,062	36,031	34,096	-0.6%	0.5%	0.0%	-0.6%
Collar	McHenry	147,897	183,241	259,524	308,760	307,774	2.2%	3.5%	1.8%	0.0%
Rural	Ogle	46,338	45,957	51,001	53,497	50,643	-0.1%	1.1%	0.5%	-0.6%
Collar	Will	324,460	357,313	502,211	677,560	690,743	1.0%	3.5%	3.0%	0.2%
Rockford	Winnebago	250,884	252,913	278,441	295,266	282,572	0.1%	1.0%	0.6%	-0.5%
Total		**7,540,461**	**7,703,176**	**8,588,493**	**8,860,769**	**8,826,361**	**0.2%**	**1.1%**	**0.3%**	**0.0%**
Illinois		**11,427,429**	**11,430,602**	**12,419,927**	**12,830,632**	**12,671,821**	**0.0%**	**0.8%**	**0.3%**	**-0.1%**

Source: U.S. Census Bureau, Decennial Censuses (1980, 1990, 2000, 2010) and County Population Totals (2019)

[a] Compound annual growth rate (CAGR)

As shown in Table 3-2, employment growth has been relatively higher than population growth over the past four decades, except for the 2000s. That decade was marked by the Great Recession of 2007–2009, which resulted in relatively low employment in the benchmark year of 2010. To illustrate, the Chicago Metropolitan Statistical Area's (MSA's) unemployment rate increased significantly during the Great Recession, from 4.9 percent in 2007 to a peak of 10.6 percent in 2010. After the peak, the unemployment rate in the Chicago MSA steadily declined and dropped to 3.9 percent in 2019. However, the Chicago-area unemployment rate continued to remain slightly higher than the Midwest and national rates of 3.6 and 3.7 percent, respectively, in 2019.

Table 3-2. Historical Employment Growth, 1980–2019

							Growth Rate[a]			
Subregion	County	1980	1990	2000	2010	2019	1980–1990	1990–2000	2000–2010	2010–2019
Rockford	Boone	14,433	16,779	18,878	18,407	24,431	1.5%	1.2%	-0.3%	3.2%
Core	Cook	2,906,747	3,108,378	3,322,763	3,157,311	3,600,552	0.7%	0.7%	-0.5%	1.5%
Collar	DeKalb	35,216	40,125	47,180	50,322	52,510	1.3%	1.6%	0.7%	0.5%
Core	DuPage	289,125	504,745	696,935	707,272	801,505	5.7%	3.3%	0.2%	1.4%
Collar	Kane	133,232	174,179	240,063	247,778	283,377	2.7%	3.3%	0.3%	1.5%
Core	Lake	210,930	296,744	415,490	441,442	475,635	3.5%	3.4%	0.6%	0.8%
Rural	Lee	16,258	17,668	17,969	16,786	16,631	0.8%	0.2%	-0.7%	-0.1%
Collar	McHenry	56,674	83,188	111,035	135,187	140,684	3.9%	2.9%	2.0%	0.4%
Rural	Ogle	18,719	20,580	25,399	23,310	22,417	1.0%	2.1%	-0.9%	-0.4%
Collar	Will	102,127	124,031	184,519	272,569	346,301	2.0%	4.2%	4.0%	2.7%
Rockford	Winnebago	130,407	150,568	175,370	160,323	162,592	1.5%	1.5%	-0.9%	0.2%
Total		**3,913,868**	**4,536,985**	**5,255,601**	**5,230,707**	**5,926,635**	1.5%	1.3%	-0.1%	1.4%
Illinois		**5,675,371**	**6,390,424**	**7,357,491**	**7,251,002**	**7,962,884**	1.2%	1.4%	-0.2%	1.1%

Source: U.S. Bureau of Economic Analysis, Personal Income and Employment by Major Component

[a] Compound annual growth rate (CAGR)

Similar to the population growth patterns, the collar counties experienced relatively large growth in employment. DuPage, Kane, and Lake Counties experienced growth earlier in the period, while Will County experienced relatively high growth throughout the period. In contrast to the population patterns, Cook County experienced employment growth in the 2010–2019 period.

The employment-to-population ratio of a geographic area provides an indication of the extent to which the population of one county may travel to another county for employment, or whether a county is a net receiver of employees (Table 3-3). For example, Cook and DuPage Counties have relatively high ratios of 0.70 and 0.87, respectively, compared with the regionwide ratio of 0.67 for the Tollway service area. Conversely, the collar counties of McHenry and Will report below average ratios of 0.46 and 0.50. Table 3-3 presents the employment-to-population ratios for the 11 counties served by the Illinois Tollway in the year 2019.

3.2.2 Historical Real Personal Income Growth Trends

Demand for travel on a toll facility is dependent on several factors, specifically the time savings expected from using the tolled route. The traveler's willingness to pay is largely determined by income. Using income, CDM Smith calculated motorists' value-of-time (VOT) for various geographies within the study area. It is helpful to understand income levels based on geography due to the significant role VOT plays in the forecasting process. Calculation of VOT is also discussed in greater detail in Chapter 4.

Table 3-3. Employment-to-Population Ratios, 2019

County	County	Employment 2019	Population 2019	Employment-to-Population Ratio
Rockford	Boone	24,431	53,544	0.46
Core	Cook	3,600,552	5,150,233	0.70
Collar	DeKalb	52,510	104,897	0.50
Core	DuPage	801,505	922,921	0.87
Collar	Kane	283,377	532,403	0.53
Core	Lake	475,635	696,535	0.68
Rural	Lee	16,631	34,096	0.49
Collar	McHenry	140,684	307,774	0.46
Rural	Ogle	22,417	50,643	0.44
Collar	Will	346,301	690,743	0.50
Rockford	Winnebago	162,592	282,572	0.58
Total		**5,926,635**	**8,826,361**	**0.67**
Illinois		**7,962,884**	**12,671,821**	**0.63**

Sources: U.S. Census Bureau, County Population Totals (2019) and U.S. Bureau of Economic Analysis, Personal Income and Employment by Major Component

The historical real per capita income trend for the service area is displayed by county in Table 3-4. Real personal per capita incomes in core counties exceeded the statewide average, particularly in DuPage and Lake Counties. Rockford-area counties (Winnebago and Boone) and rural counties (Lee and Ogle), along with the outer collar county of DeKalb, had per capita personal incomes below the statewide average in all years.

Table 3-4. Real Per Capita Personal Income Growth, 1980–2019 (in 2012 Dollars)

							Growth Rate[a]			
Subregion	County	1980	1990	2000	2010	2019	1980–1990	1990–2000	2000–2010	2010–2019
Rockford	Boone	23,672	29,662	36,299	36,504	44,420	2.3%	2.0%	0.1%	2.2%
Core	Cook	28,303	35,188	44,959	46,131	58,766	2.2%	2.5%	0.3%	2.7%
Collar	DeKalb	22,189	27,326	34,071	32,742	38,612	2.1%	2.2%	-0.4%	1.9%
Core	DuPage	33,248	44,139	60,818	55,321	68,664	2.9%	3.3%	-0.9%	2.4%
Collar	Kane	27,131	33,938	39,631	40,822	48,401	2.3%	1.6%	0.3%	1.9%
Core	Lake	32,703	46,392	60,983	59,163	73,593	3.6%	2.8%	-0.3%	2.5%
Rural	Lee	21,166	25,864	30,422	34,476	39,302	2.0%	1.6%	1.3%	1.5%
Collar	McHenry	27,609	35,206	43,299	43,503	53,152	2.5%	2.1%	0.1%	2.3%
Rural	Ogle	21,006	26,958	33,857	36,964	43,320	2.5%	2.3%	0.9%	1.8%
Collar	Will	25,330	30,489	38,834	41,444	50,069	1.9%	2.5%	0.7%	2.1%
Rockford	Winnebago	25,023	30,015	35,185	35,202	40,986	1.8%	1.6%	0.0%	1.7%
Total		**28,541**	**36,216**	**46,574**	**46,673**	**58,410**	**2.4%**	**2.6%**	**0.0%**	**2.5%**
Illinois		**26,536**	**33,185**	**42,396**	**43,981**	**53,565**	**2.3%**	**2.5%**	**0.4%**	**2.2%**

Source: Woods & Poole Economics Inc., Washington, D.C. Copyright 2020. Woods & Poole does not guarantee the accuracy of this data. The use of these data and the conclusion drawn from it are solely the responsibility of CDM Smith.

[a] Compound annual growth rate (CAGR)

Real personal per capita income grew between 2.0 percent and 2.5 percent for the state of Illinois for each decade, except the 2000–2010 decade, when the impacts of the Great Recession affected personal incomes in 2010. Per capita personal income growth in DuPage and Lake Counties outpaced the statewide rate in the 1980s, 1990s, and 2010s, and Cook County's growth in the 2010s also exceeded the statewide rate. Per capita personal income growth in Winnebago and DeKalb Counties lagged the statewide rate in the 1980s, 1990s, and 2010s.

3.2.3 Subregional Development Trends

The 11 Illinois counties served by the Illinois Tollway System have different levels of influence on the Tollway system. Cook, DuPage, and Lake are the three core counties of the Illinois Tollway System. All five routes travel though the core counties, and most toll revenue is generated within them.

The collar counties of DeKalb, Kane, McHenry, and Will are of increasing importance to Illinois Tollway traffic and revenue, because their population and employment growth rates exceed the regional average. The two counties of the Rockford metropolitan area (Winnebago and Boone) serve as a third subregion and have a distinct growth profile as a mature industrial subregion. Finally, the two rural counties of Lee and Ogle represent the fourth subregion. Figure 3-1 below illustrates the locations of these counties in the Illinois Tollway service area.

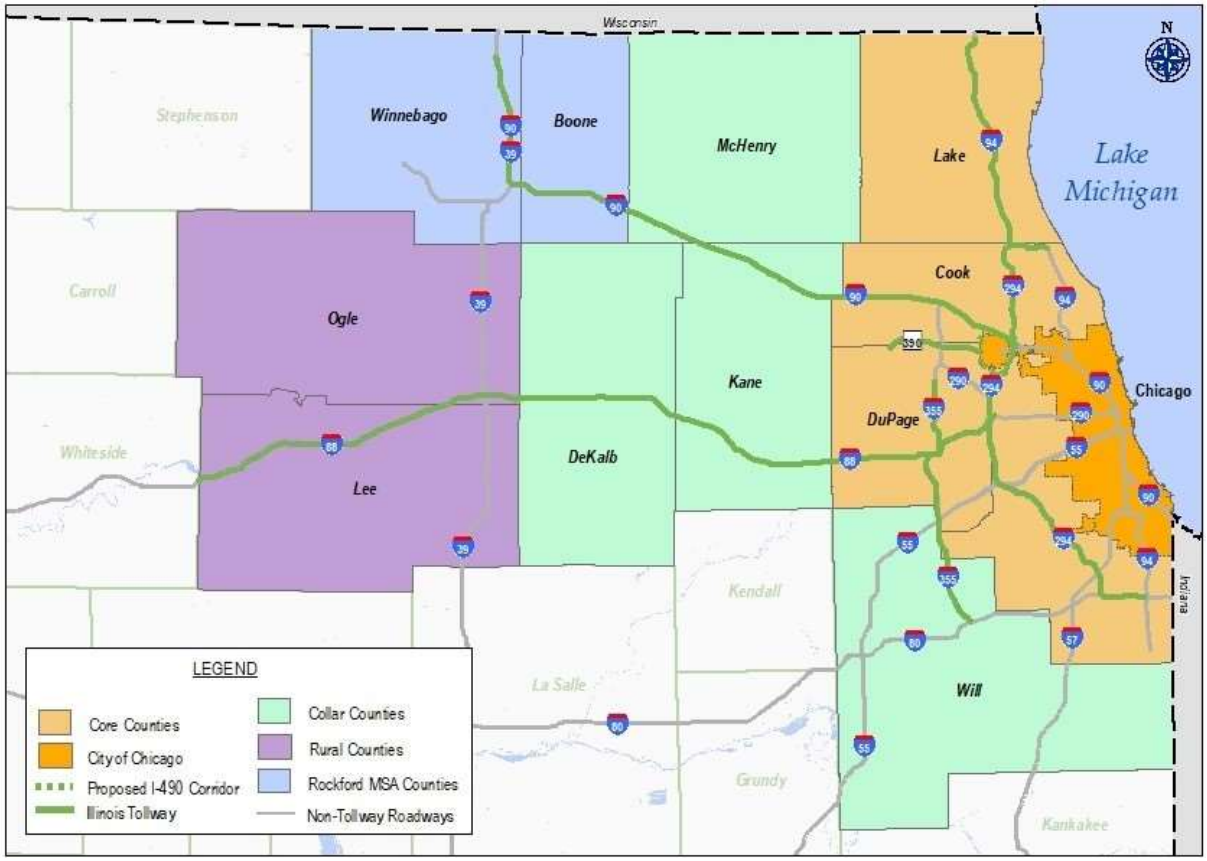


Figure 3-1. Illinois Tollway Service Area

3.2.3.1 Core Counties

Cook, DuPage, and Lake Counties make up the core Illinois Tollway counties, representing over three-quarters of the total population of the service area, as well as the areas from which most toll revenue and transactions are generated. The Tri-State Tollway (I-94/294) and IL 390 Tollway lie entirely within the core counties, and most of the Veterans Memorial Tollway (I-355) is also located within the core. The most heavily traveled segments of the remaining two facilities, the Jane Addams Memorial Tollway (I-90) and Reagan Memorial Tollway (I-88), are also located within the core. Employment and population growth in the core counties have the largest impact on overall transportation and revenues for the Tollway system.

Cook and DuPage Counties are both mature counties with leveled-off population growth. Lake County is somewhat later in its development relative to Cook and DuPage Counties. However, its higher growth began flattening between the 2000 and 2010 censuses. The subsequent section summarizes the population growth trend within each county.

- **Cook County:** As the central county of the Chicago metropolitan area, Cook County is heavily urbanized with little land left for new development. As a result, Cook County's population over the past four decades has been relatively stable, with a long-run average population of about 5.2 million. The county's population declined modestly in the 1980s, grew in the 1990s to under 5.4 million, and declined again modestly in the 2000s. Between 2010 and 2019, the population has been relatively stable at under 5.2 million.

- **DuPage County:** DuPage County grew rapidly between 1980 and 2000, gaining more than 120,000 residents each in the two decades, but its population has largely stabilized after 2000. Between 2000 and 2010, the population increased by about 12,000, and only an additional 6,000 residents were added between 2010 and 2019.

- **Lake County:** Compared with the other two core counties, Lake County has more land available for new development, and its population grew at a relatively faster rate in the 1990s and 2000s, when it added more than 200,000 residents. However, like the other core counties, Lake County's population was relatively stable during the 2010s.

The combined population of the core counties increased 7.3 percent in the period between 1980 and 2010, from 6.4 million to 6.8 million. Because of their large population bases, these three core counties accounted for approximately 35 percent of the absolute growth in population among the 11 Illinois counties in the Tollway service area during that period. The population of the core counties has been largely stable since 2010, like the larger Tollway service area.

Employment growth has occurred at a faster and sustained pace, increasing 26.4 percent, from 3.4 million to 4.3 million between 1980 and 2010. This represents over two-thirds of all job growth in the 11-county region during this period. In contrast to population trends, employment has continued to grow in the core counties since 2010, adding 572,000 jobs, or about 13.4 percent, to reach 4.9 million jobs in 2019. The three core counties represented 82.1 percent of job growth in the Tollway service area between 2010 and 2019.

3.2.3.2 Collar Counties

The collar counties—Will, Kane, McHenry, and DeKalb—lie just outside the ring of core counties surrounding Chicago. These counties contribute to trip generation for three facilities: the southern portion of the Veteran Memorial Tollway (I-355) is located in Will County, and segments of the western Jane Addams Memorial Tollway (I-90) and western Reagan Memorial Tollway (I-88) are located in Kane and DeKalb Counties. McHenry County also contributes to growth on the Jane Addams Tollway. While these counties do not represent the core of the Tollway service area, they have more developable land available for new development over the period of the 2050 forecast; as a result, the collar counties are expected to contribute to additional growth on the Tollway system.

Growth in these four collar counties was slower in the 1950–1990 period of suburbanization, when suburban Cook, DuPage, and Lake Counties were growing more rapidly. After 1990, however, growth in these four collar counties accelerated as available land for new development diminished in the core counties.

- **Will County:** Will County is home to some of the older cities and towns in the Chicago area, including the historical satellite city of Joliet. It has experienced only recently rapid suburbanization and is one of the fastest growing counties in the United States. Growth was particularly large in the 1990s and 2000s, when the county's population grew by more than 320,000 residents. While the core counties experienced little to no growth during the 2010s, Will County's population grew at an annual average rate of 0.4 percent, adding over 13,000 residents. By 2019, Will County's population had nearly matched Lake County's population.

- **Kane County:** Elgin and Aurora are major historical satellite cities in the Chicago region, and they are among the top 10 largest cities in Illinois. Because of its distance from the core of the Chicago region, Kane County grew more slowly than other counties during the early period of suburbanization. However, its growth was relatively high between 1990 and 2010, when almost 200,000 residents were added. Like Will County, Kane County's population has continued to grow since 2010, and more than 17,000 residents were added between 2010 and 2019.

- **McHenry County:** McHenry County's population more than doubled between 1980 and 2010, growing to about 309,000 residents. About half of that growth occurred in the 1990s. Much of this growth was in and around the county's older towns of Crystal Lake, Algonquin, and McHenry. In contrast to the larger collar counties of Will and Kane, McHenry County's population remained relatively stable in the 2010s.

- **DeKalb County:** The main city in DeKalb County, DeKalb, is home to Northern Illinois University. While much of the county remains rural in character, the population growth profile in the 1990s and 2000s was more like that of a suburban county in the "takeoff" period of growth. The population grew by about 27,000, or 35 percent, during those two decades. However, like McHenry County, DeKalb County's population has been largely stable since 2010.

Collectively, the four collar counties almost doubled in population between 1980 and 2010, from 825,000 to 1.6 million residents. This accounted for over 59 percent of all population growth in the 11-county region. Since 2010, the collar counties have grown by more than 29,000 residents, partially offsetting population losses elsewhere in the service area.

Employment grew at an even faster rate, 115.7 percent, during the same period, from about 327,000 jobs in 1980 to 706,000 jobs in 2010. Since 2010, the collar counties added almost 117,000 jobs, or 16.6 percent. The majority of that growth, almost 74,000 jobs, has occurred in Will County. The collar counties represent about 16.8 percent of new jobs added between 2010 and 2019 in the service area.

3.2.3.3 Rockford-Area Counties

The Rockford MSA comprises Winnebago and Boone Counties. The only Tollway facility to pass through this area is the westernmost segment of the Jane Addams Memorial Tollway (I-90). As a result, employment and population growth in the Rockford area would largely impact one facility only.

The City of Rockford, located within Winnebago County, was the second largest city in Illinois throughout the twentieth century, but was overtaken by Aurora in the 2000 census. Like the collar counties, population growth in the Rockford area occurred in the 1990s and 2010s, but has since declined. Winnebago County's population grew by over 42,000 residents, or 16.7 percent, between 1990 and 2010, and Boone County's population grew by more than 23,000 residents. Together, the population of the Rockford-area counties declined by over 13,000 residents, or 3.8 percent, between 2010 and 2019, with Winnebago County representing the majority of the loss.

Winnebago County has far more employment than Boone County, representing 85–90 percent of the combined total, and its employment trends strongly influence overall trends for the Rockford-area counties. After strong employment growth in the 1980s and 1990s, when almost 50,000 jobs, or 34.1 percent, were added, employment contracted sharply in the 2000s. The Rockford area counties lost over 15,000 jobs, or 8.0 percent, during the decade, likely reflecting the impact of the Great Recession. From 2010 through 2019, the two counties had almost 8,300 jobs, partially offsetting job losses in the 2000s.

3.2.3.4 Rural Counties

Lee and Ogle Counties lie at the western end of the Reagan Memorial Tollway (I-88). Both counties are largely rural in character and are expected to remain rural throughout the forecast period of 2050. As a result, growth in employment or population in these rural counties is expected to have little impact on the Tollway system's transactions or revenue.

- **Lee County:** Lee County's population has been relatively stable, ranging between 34,000 and 37,000, since 1980. Similarly, its employment has also remained relatively stable, ranging between 16,000 and 18,000 during the same period.
- **Ogle County:** In contrast, the population of Ogle County grew modestly in the 1990s and 2000s. During that period, it added almost 7,500 residents, or 16.4 percent. However, Ogle County's population declined by over 2,800, or 5.3 percent, between 2010 and 2019.

Employment grew in the 1990s, rising from more than 20,000 to over 25,000. However, employment has since declined to over 22,000 in 2019.

3.2.4 List of Major Regional Employers

A review of the region's major employers, both in terms of global employment and gross revenues, was conducted to identify the significance of their economic contribution to the Chicago area and Illinois. Table 3-5 lists some of the largest Fortune 500 employers located within the Chicago area, as reported in the magazine's annual ranking in 2019. As illustrated in Figure 3-2, many of these employers are near the Illinois Tollway system. In particular, many headquarters are located along the Tri-State Tollway (I-94/I-294) in northern Cook County and southern Lake County, as well as in a second cluster along the Reagan Memorial Tollway (I-88) in DuPage County. Almost all major corporate headquarters in the Chicago region not located in the central business district are located near the Tollway.

Table 3-5. Fortune 500 Companies in the Chicago Metropolitan Area (2019)

ID	Employer Name	Location	Fortune 500 Ranking	Headquarters Address	Employees (worldwide)	Gross Earnings ($ millions)	Industry
Central Chicago							
1	Boeing	Chicago	28	100 N Riverside Plaza, Chicago, IL, 60606	153,000	$101,127	Aerospace and Defense
2	ADM	Chicago	49	77 W Wacker Dr, Chicago, IL, 60601	31,600	$64,341	Food production
3	United Airlines	Chicago	78	233 S Wacker Dr, Chicago, IL, 60606	92,000	$41,303	Airline
4	Exelon	Chicago	93	10 S Dearborn St, Chase Tower, Chicago, IL, 60680	33,383	$35,985	Gas and Electric
5	McDonald's	Chicago	149	1035 Randolph St, Chicago, IL, 60607	210,000	$21,025	Food Services
6	Jones Lang LaSalle	Chicago	189	200 Randolph St, Chicago, IL, 60601	90,000	$16,318	Commercial Real Estate
7	LAQ	Chicago	262	500 W Madison St, Chicago, IL, 60661	51,000	$11,876	Wholesalers
8	Conagra Brands	Chicago	386	222 W Merchandise Mart Plaza, Chicago, IL, 60654	12,400	$7,983	Food Consumer Products
9	R.R. Donnelley	Chicago	445	111 S Wacker Dr, Chicago, IL, 60606	39,500	$6,800	Publishing, Printing
10	Northern Trust	Chicago	453	50 S LaSalle St, Chicago, IL, 60603	18,800	$6,658	Commercial Banks
11	Old Republic International	Chicago	481	307 N Michigan Ave, Chicago, IL, 60601	9,000	$6,021	Insurance
Other Chicago Metropolitan Area							
12	Abbott Laboratories	Lake Bluff	103	100 Abbott Park Rd, Lake Bluff, IL, 60064	103,000	$30,578	Medical Products and Equipment
13	Ulta Beauty	Bolingbrook	449	1000 Remington Blvd, Bolingbrook, IL, 60440	30,000	$6,716	Specialty Retailers
14	Walgreens	Deerfield	17	200 Wilmot Rd, Deerfield, IL, 60015	299,000	$131,537	Food and Drug

ID	Employer Name	Location	Fortune 500 Ranking	Headquarters Address	Employees (worldwide)	Gross Earnings ($ millions)	Industry
15	Caterpillar	Deerfield	58	501 Lake Cook Rd, Deerfield, IL, 60015	104,000	$54,722	Construction and Farm Machinery
16	Mondelez International	Deerfield	116	3 Parkway N, Deerfield, IL, 60015	80,000	$25,938	Food Consumer Products
17	Baxter International	Deerfield	286	1 Baxter Way, Deerfield, IL, 60015	50,000	$11,127	Medical Products and Equipment
18	Univar	Downers Grove	353	3075 Highland Parkway, Downers Grove, IL, 60515	8,500	$8,632	Wholesalers
19	Dover	Downers Grove	412	3005 Highland Parkway, Downers Grove, IL, 60515	24,000	$7,395	Industrial Machinery
20	Illinois Tool Works	Glenview	214	3650 W Lake Ave, Glenview, IL, 60026	48,000	$14,768	Industrial Machinery
21	Anixter International	Glenview	364	2301 Patriot Blvd, Glenview, IL, 60015	9,300	$8,400	Wholesalers
22	Tenneco	Lake Forest	267	500 N Field Dr, Lake Forest, IL, 60045	81,000	$11,763	Motor Vehicle and Parts
23	W.W. Grainger	Lake Forest	282	14441 IL 60, Lake Forest, IL, 60045	23,850	$11,221	Wholesalers
24	Packaging Corp. of America	Lake Forest	432	1 N Field Ct, Lake Forest, IL, 60045	15,000	$7,014	Packaging, Containers
25	CDW	Lincolnshire	191	75 Tri State International, Lincolnshire, IL, 60069	9,019	$16,240	IT Services
26	Navistar International	Lisle	308	2701 Navistar Dr, Lisle, IL, 60532	13,100	$10,250	Construction and Farm Machinery
27	AbbVie	North Chicago	96	1 Waukegan Rd, North Chicago, IL, 60064	30,000	$32,753	Pharmaceuticals
28	Allstate	Northbrook	82	3075 Sanders Rd, Northbrook, IL, 60062	45,420	$39,815	Insurance
29	TreeHouse Foods	Oak Brook	489	2021 Spring Rd, Oak Brook, IL,60523	12,700	$5,812	Food Consumer Products
30	Discover Financial	Riverwoods	253	2500 Lake Cook Rd, Riverwoods, IL, 60015	16,600	$12,848	Commercial Banks
31	Arthur J Gallagher	Rolling Meadows	435	2850 Golf Rd,Rolling Meadows, IL, 60008	30,362	$6,934	Financials
32	US Foods Holding	Rosemont	125	9399 W Higgins Rd, Rosemont, IL, 60018	24,900	$24,175	Wholesalers
33	Motorola Solutions	Schaumburg	416	1295 E Algonquin Rd, Schaumburg, IL, 60196	16,000	$7,343	IT Equipment
34	Ingredion	Westchester	486	5 Westbrook Corp Ctr, Westchester, IL, 60154	11,000	$5,841	Food Production
Other Illinois							
35	State Farm Insurance	Bloomington	36	1 State Farm Plaza, Bloomington, IL, 61710	56,788	$81,732	Insurance
36	Deere	Moline	87	1 John Deere Plaza, Moline, IL, 61265	74,413	$37,357	Construction and Farm Machinery

Source: Fortune Magazine*, Fortune 500 Rankings: 2019 Rankings.*

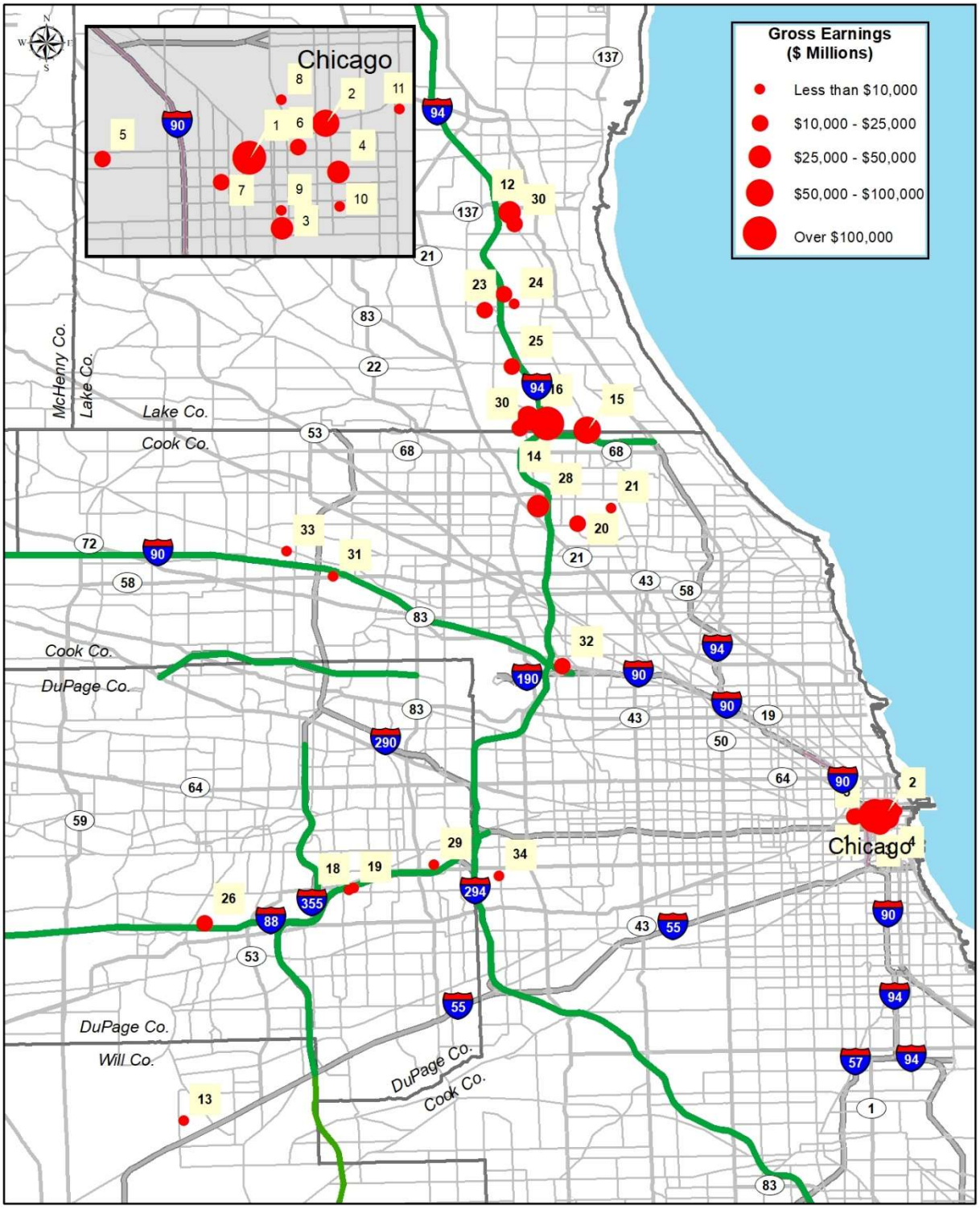


Figure 3-2. Fortune 500 Companies Headquartered in the Chicago Metropolitan Area (2019), Gross Earnings ($ Millions)

3.3 Socioeconomic Forecasts

CDM Smith retained the services of Dr. Wies to develop an independent review of the Chicago Metropolitan Agency for Planning (CMAP) ON TO 2050 population and employment forecasts and to recommend adjustments. Regional population and employment data are inputs into travel demand model, which is used in developing traffic and toll revenue forecasts.

Following the independent review, Dr. Wies provided CDM Smith with an alternative socioeconomic forecast to ON TO 2050. His independent forecast is a policy-neutral scenario based primarily on observed development trends and land use patterns. Population and employment data were developed and submitted by traffic analysis subzones within the 21 counties represented in the travel demand model, in decade increments through the year 2050.

This section provides an overview of Dr. Wies's methodology, a summary of his independent socio-economic forecast, and a comparison of that forecast to other industry benchmarks.

3.3.1 Forecasting Method

In contrast to CMAP's long-term socioeconomic forecasts, which are influenced by ON TO 2050 policy recommendations that support infill development and reinvestment in existing communities, Dr. Wies's forecast is based primarily on a "carrying capacity" analysis. This approach identifies the amount of developable land available to be built out over the planning horizon, and it derives forecasts of potential population and employment in those areas based on existing land use patterns.

Specifically, developable land was identified using CMAP's Land Use Inventory, which provides a parcel-level categorization of land uses. This approach also accounted for undevelopable land uses, including protected natural areas, wetlands, and floodplains, to ensure they were excluded from the carrying capacity analysis. Once the amount of developable land was established, the approach calculated the number of households and employment based on the prevailing density and land-use mix of neighboring areas.

Final forecasts based on carrying capacities then were distributed over the interim milestone years using an exponential interpolation function. This function was chosen because it allows uniform growth over time for subzones surrounded by uniform density (e.g., mature, built-out areas or rural areas), but the function delays growth in subzones surrounded by non-uniform density (e.g., exurban areas).

The carrying capacity approach was used only for the seven-county CMAP region of Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will Counties in northeastern Illinois, due to the availability of detailed land use data.

For the remaining counties in the larger modeling region, Dr. Wies modified ON TO 2050 forecasts for those counties based on an average of forecasts from other sources, including local metropolitan planning organizations (MPOs) of record (including Northwestern Indiana Regional Planning Commission, Southeastern Wisconsin Regional Planning Commission, Region 1 Planning Council [formerly the Rockford Metropolitan Agency for Planning], and the Kankakee Area

Transportation Study) and proprietary socioeconomic forecasts from independent sources such as Woods & Poole (W&P) and Moody's Analytics.

3.3.2 Recommended Forecasts

Dr. Wies's socioeconomic forecasts are depicted in Table 3-6 and Table 3-7, first tabulated by county-level population and employment for each decade through 2050, followed by series of maps visualizing the compound average growth rates (CAGRs) over time.

Table 3-6. Recommended Population Forecast

POPULATION						
County	2015	2020	2030	2040	2050	CAGR 2020–2050
CMAP						
Cook	5,148,908	5,189,941	5,273,467	5,359,026	5,446,731	0.2%
Chicago	2,683,182	2,710,572	2,766,012	2,822,350	2,879,608	0.2%
Suburban Cook	2,465,726	2,479,369	2,507,455	2,536,676	2,567,123	0.1%
DuPage	921,429	924,403	930,561	937,016	943,793	0.1%
Kane	524,753	538,749	568,598	601,233	637,099	0.6%
Kendall	123,038	137,499	168,515	202,720	240,690	1.9%
Lake	686,299	694,625	711,955	730,258	749,632	0.3%
McHenry	305,787	320,549	351,897	385,957	423,119	0.9%
Will	678,228	706,945	767,774	833,689	905,491	0.8%
CMAP Total	**8,388,442**	**8,512,710**	**8,772,766**	**9,049,899**	**9,346,557**	**0.3%**
EXTERNAL CMAP						
Illinois						
Boone	53,277	57,315	65,390	73,466	81,541	1.2%
DeKalb	97,986	105,229	119,714	134,199	148,685	1.2%
Grundy	50,251	54,914	64,239	73,564	82,890	1.4%
Kankakee	105,739	110,419	119,779	129,139	138,499	0.8%
LaSalle	107,028	108,789	112,310	115,831	119,352	0.3%
Lee[a]	3,658	3,708	3,809	3,909	4,010	0.3%
Ogle[a]	18,724	19,117	19,903	20,689	21,475	0.4%
Winnebago	282,381	291,276	309,066	326,856	344,646	0.6%
Indiana						
Lake	481,504	486,433	496,290	506,147	516,004	0.2%
LaPorte	104,450	104,603	104,909	105,214	105,520	0.0%
Porter	164,342	171,590	186,087	200,584	215,080	0.8%
Wisconsin						
Kenosha	164,059	173,291	191,754	210,218	228,681	0.9%
Racine	190,229	194,670	203,551	212,433	221,314	0.4%
Walworth	100,217	104,515	113,110	121,705	130,300	0.7%
External CMAP Total	**1,923,845**	**1,985,867**	**2,109,910**	**2,233,953**	**2,357,997**	**0.6%**
Regional Total	**10,312,287**	**10,498,577**	**10,882,676**	**11,283,853**	**11,704,553**	**0.4%**

Source: Independent socioeconomic forecast provided by Dr. Wies.

[a]Forecast reflects the portion of the county in the travel demand modeling area only.

Table 3-7. Recommended Employment Forecast

EMPLOYMENT						
County	2015	2020	2030	2040	2050	CAGR 2020–2050
CMAP						
Cook	2,591,153	2,631,606	2,722,665	2,830,037	2,957,915	0.4%
Chicago	1,377,466	1,410,580	1,484,564	1,570,773	1,671,962	0.6%
Suburban Cook	1,213,687	1,221,026	1,238,101	1,259,265	1,285,953	0.2%
DuPage[a]	615,430	620,470	631,495	644,001	658,326	0.2%
Kane	210,578	216,163	236,776	262,263	294,694	1.0%
Kendall	27,473	31,331	39,851	49,778	61,657	2.3%
Lake	338,104	344,823	360,235	379,023	402,399	0.5%
McHenry	98,158	101,678	115,263	131,323	150,789	1.3%
Will	204,604	216,203	243,166	276,733	319,509	1.3%
CMAP Total	**4,085,500**	**4,162,275**	**4,349,451**	**4,573,157**	**4,845,289**	**0.5%**
EXTERNAL CMAP						
Illinois						
Boone	17,215	18,095	19,855	21,615	23,375	0.9%
DeKalb	37,259	38,045	39,618	41,191	42,763	0.4%
Grundy	18,632	19,160	20,215	21,270	22,325	0.5%
Kankakee	42,985	43,952	45,887	47,822	49,757	0.4%
LaSalle	43,412	43,622	44,042	44,463	44,883	0.1%
Lee[b]	254	254	254	253	253	0.0%
Ogle[b]	6,888	6,886	6,883	6,879	6,876	0.0%
Winnebago	127,391	131,993	141,198	150,402	159,607	0.6%
Indiana						
Lake	185,816	184,515	181,912	179,310	176,707	-0.1%
LaPorte	40,463	41,306	42,992	44,679	46,365	0.4%
Porter	58,731	60,439	63,854	67,269	70,684	0.5%
Wisconsin						
Kenosha	59,214	62,781	69,915	77,049	84,183	1.0%
Racine	73,731	76,670	82,548	88,426	94,304	0.7%
Walworth	40,062	41,979	45,814	49,649	53,484	0.8%
External CMAP Total	**752,053**	**769,698**	**804,988**	**840,278**	**875,567**	**0.4%**
Regional Total	**4,837,553**	**4,931,973**	**5,154,438**	**5,413,435**	**5,720,856**	**0.5%**

Source: Independent socioeconomic forecast provided by Dr. Wies.

[a] Three Traffic Analysis Zones (TAZ) covering the southwest portion of Chicago O'Hare International Airport are part of the city of Chicago but located in DuPage County. Employment for these subzones is listed under DuPage County and not the city of Chicago in this table.

[b] Forecast reflects the portion of the county in the travel demand modeling area only.

Dr. Wies's population forecasts for the 21-county modeling region increase from a 10.3 million baseline in 2015 to 11.7 million in 2050, corresponding to an average 0.4 percent annual growth rate. The seven-county core CMAP region is projected to increase in population at a slightly slower rate than the surrounding 14-county area in Illinois, Indiana, and Wisconsin, with 0.3 percent and 0.6 percent average annual growth rates, respectively. Cook County, including the city of Chicago and neighboring suburbs, is forecast to grow relatively slowest of the 21 counties

in the modeling area, despite the largest absolute growth, due to its largest existing population base.

Dr. Wies's employment forecast for the 21-county region increases from a 4.8 million base in 2015 to 5.7 million in 2050, which corresponds to an average annual growth of 0.5 percent. This rate is slightly higher than the population growth over the same time period. In contrast to population growth, employment in the seven-county core CMAP region is projected to increase slightly faster than the surrounding 14-county area, with 0.5 and 0.4 percent average annual growth rates, respectively.

Figure 3-3 and Figure 3-4 illustrate the spatial pattern of growth at a finer level of geographic detail. Across decades and for both population and employment, growth rates are consistently highest in the outer portions of the seven-county CMAP region. There, vacant and agricultural land is available for development, located near existing population and jobs centers in the Chicago region. In contrast, growth rates in the already-developed core of the region are very low, reflecting little available land to support new development. Outside of the CMAP region, growth rates are generally low across the board, ranging from very low growth in northwest Indiana, to low growth in rural areas of Illinois and the Rockford region, to slightly higher growth in southeast Wisconsin.

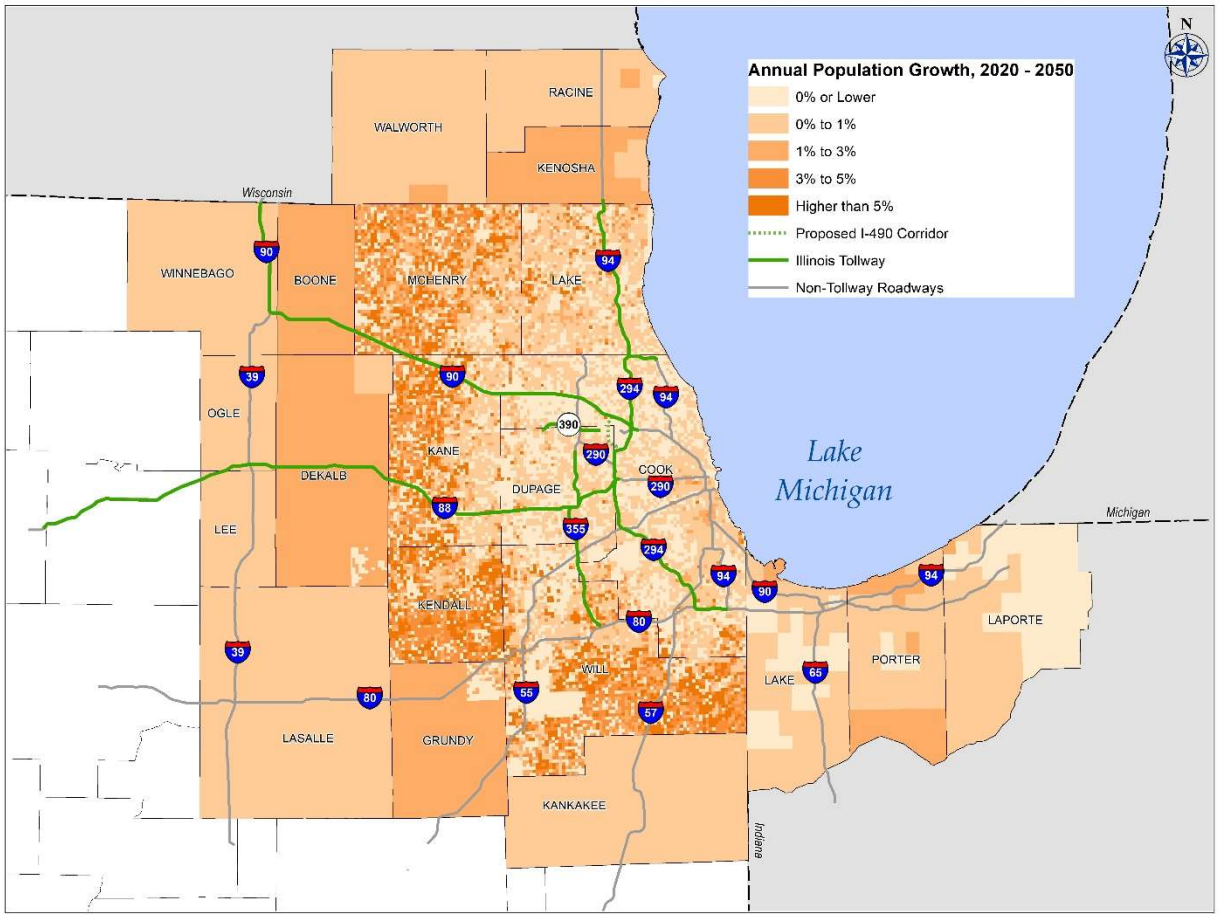


Figure 3-3. Population Annual Growth Rate, 2020–2050

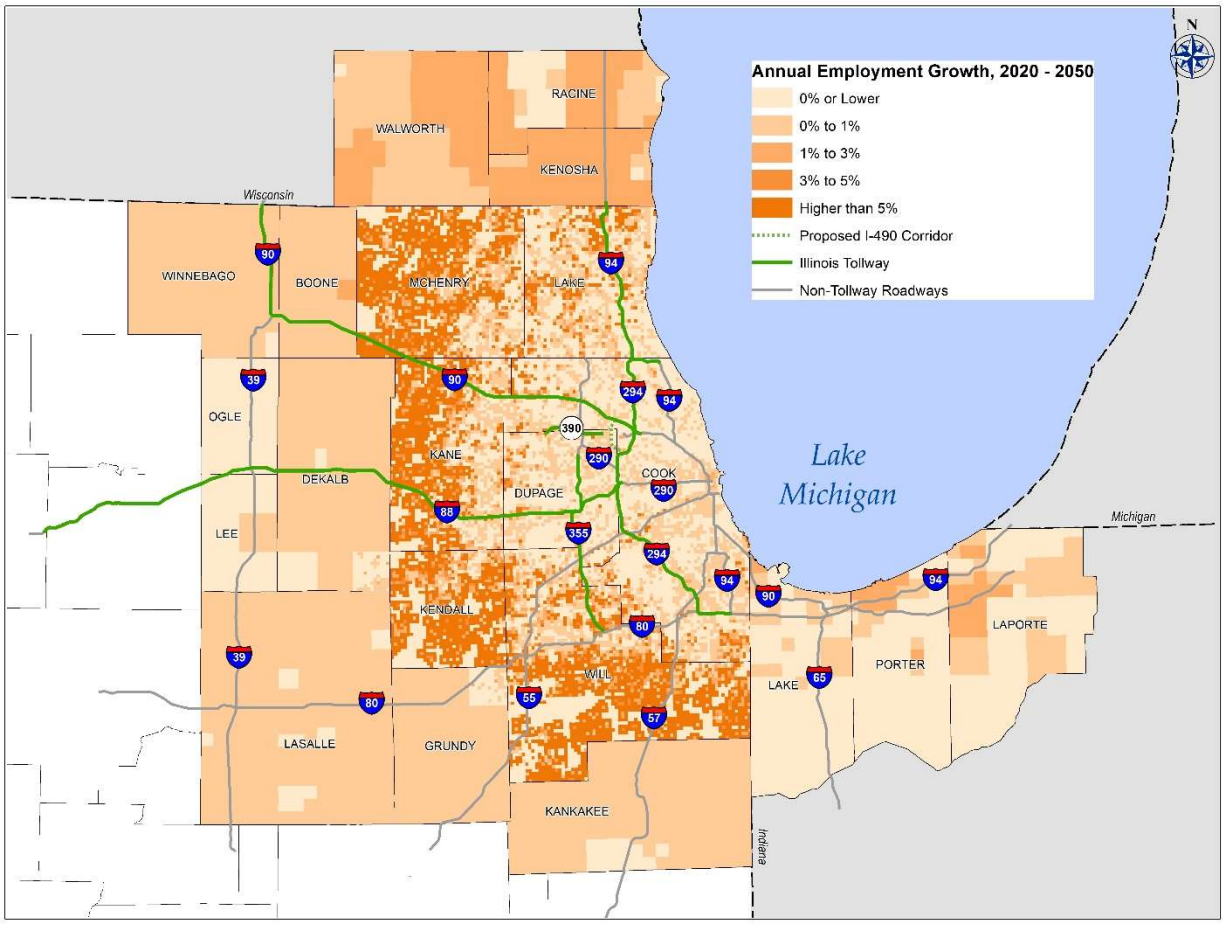


Figure 3-4. Employment Annual Growth Rate, 2020–2050

3.3.3 Comparison of Recommended Forecasts to Other Sources

This section compares Dr. Wies's socioeconomics with benchmark forecasts from a sample of public and private sector sources. Because of the availability of historical data, socioeconomic forecasts in this section are compared for a six-county core region, corresponding to the former Northeastern Illinois Planning Commission (NIPC) definition of Cook, DuPage, Kane, Lake, McHenry, and Will Counties. This type of comparison illustrates differing patterns and magnitudes of regional population and employment across forecasts.

As shown in Figure 3-5, the six-county Chicago metropolitan area slowly increased in population during the two decades from 1970 to 1990, accelerated in the 1990s, and slowed in the 2000s, plateauing to around 8.3 million in the 2010s. CMAP forecasts those six counties to increase in population to more than 10.5 million by 2050, at a pace unseen since the relatively high-growth 1990s. In contrast, Dr. Wies and independent private-sector forecasts from W&P and Moody's Analytics all project a population growth rate below CMAP's forecasts. Both W&P and Moody's Analytics downwardly revised population forecasts in each subsequent annual release of their respective forecasts over the last few years, with Moody's Analytics 2020 forecast projecting an actual decline in population through 2050. W&P projects a plateauing of population, especially

after 2030. Dr. Wies' forecasts are similar to the 2020 W&P forecast for the next decade, and the forecasts continue that general growth pattern through 2050.

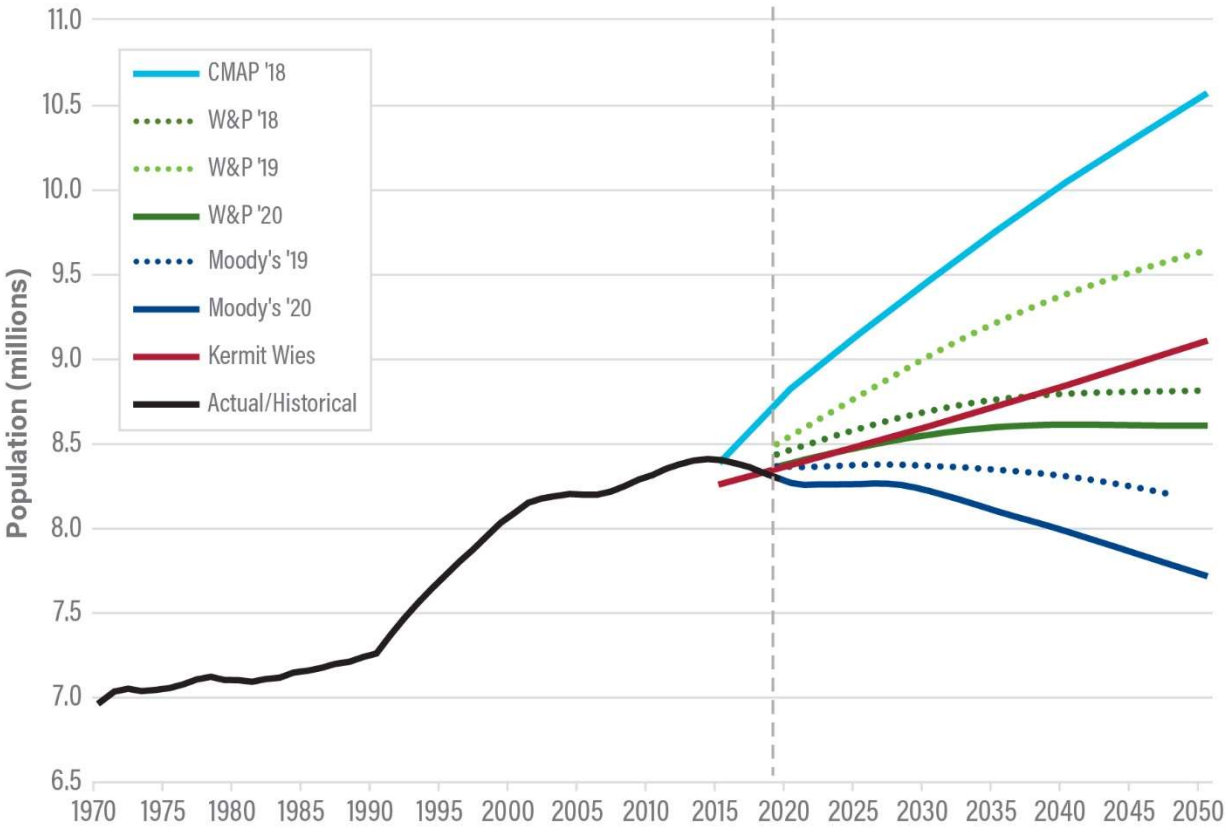


Figure 3-5. Population Forecast Comparison

Employment forecasts typically follow either the U.S. Bureau of Labor Statistics' (BLS) or U.S. Bureau of Economic Analysis' (BEA) definition of employment. The BEA definition is more encompassing, which results in higher employment forecasts.[4] The use of the two different definitions is apparent in Figure 3-6.

[4] BLS data are derived from a business establishments survey and are generally less encompassing than BEA, as the data do not include agricultural workers, military, proprietors, household workers, and miscellaneous employment. BEA data represent a more encompassing measure of full-time and part-time workers.

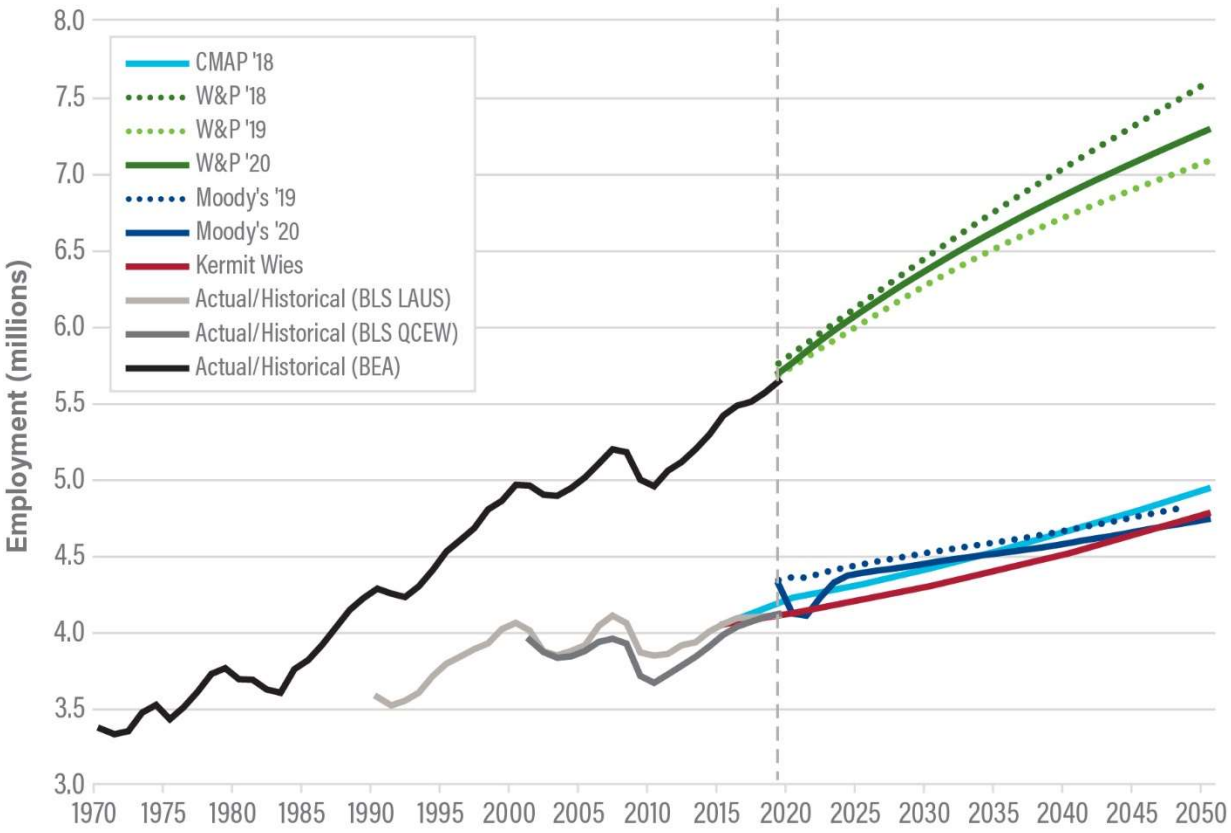


Figure 3-6. Employment Forecast Comparison

Unlike population in the six-county metropolitan area, employment is forecast to increase steadily throughout the 2050 forecasting horizon, according to each published source. W&P adheres to the BEA definition and forecasts a growth pattern in parallel with the growth observed between the last recession in 2007–2009 and the COVID-19 pandemic, increasing to about 7.3 million by 2050. Other sources adhere to the narrower BLS definition and generally forecast slightly decelerated growth rates through 2050 relative to W&P. Moody's Analytics, obtained in mid-2020, in the early COVID-19 time frame, forecasts an employment dip and rebound in the next five years, followed by steady growth to about 4.7 million in 2050. Dr. Wies's employment forecast results in a similar 2050 level of employment, at 4.8 million, from a slightly lower base in 2020. CMAP's employment forecast generally parallels Dr. Wies's but is generally 100,000 to 150,000 higher in each year.

4BLS data are derived from a business establishment survey and are generally less encompassing than BEA, because the data do not include agricultural workers, military, proprietors, household workers, and miscellaneous employment. BEA data represent a more encompassing measure of full-time and part-time workers.

Chapter 4

Transactions & Revenue Approach

This chapter summarizes the traffic and revenue analysis conducted for the Illinois Tollway. It presents an overview of the travel demand modeling process and describes the primary inputs to the model, key components of the model structure, and the base-year trip table calibration process.

4.1 Overview of Travel Demand Model

CDM Smith has developed and maintains a purpose-built regional travel demand model called Tollway 2050. This model is the basis for all travel demand modeling and analyses CDM Smith conducts on behalf of the Illinois Tollway. Although based on CMAP's ON TO 2050 regional model, this customized iteration has undergone extensive network revision and calibration to speed and volumes for each time period.

Prior to the tolling analyses, the model was calibrated using 2017 traffic counts and toll transaction data, with specific attention given to Illinois Tollway corridors to ensure the model reasonably reflects current conditions. Data from 2017 were used due to the impact of substantial construction activity on the Tollway system in 2018 and 2019 and the impacts of the COVID-19 pandemic on travel in 2020. Trip tables were adjusted extensively, and networks were checked and updated to include projects critical to the Illinois Tollway system. In addition, CDM Smith made updates to reflect travel time reliability and traffic congestion.

The calibration effects were applied to future-year conditions for milestone years of 2020, 2030, 2040, and 2050. In addition, a range of future-year network scenarios were analyzed for 2025 and 2030 to assess the impact of major capacity expansion projects included in the Tollway's Move Illinois program. Each future-year network was reviewed for consistency, inclusion, and proper coding of programmed transportation improvements. Official documentation of planned transportation network improvements and schedule were used to develop highway networks representative of year-by-year construction progress. An overview of the Move Illinois program can be found in Chapter 1, while specific program details—including dates and project attributes—can be found under the assumptions listed in Chapter 5.

4.2 Model Inputs

This section describes the primary inputs and assumptions used in the travel demand model's calculations, including trip tables, traffic analysis zones, highway networks, time periods, value of time (VOT), and vehicle operating costs (VOCs).

4.2.1 Trip Tables

Trip tables summarize the origins and destinations of trips by geographic locations, called traffic analysis zones (TAZ, see Section 4.2.2 for a description of TAZs), for each model year. They rely on forecasts of future growth in population and employment, as well as assumptions about trip-making behavior, to estimate the number of trips produced from and attracted to each TAZ.

As described in Chapter 3, CDM Smith received an independent socioeconomic forecast. The growth in population and employment in that data set was translated to trip generation and trip distribution using the customized model to update the CMAP ON TO 2050 trip tables. CDM Smith borrowed CMAP's trip generation data but converted trip distribution in the Cube platform to complete the trip table updates. CDM Smith relied on assumptions from CMAP's ON TO 2050 model, such as special trip types, transit trips, and auto occupancy, as well as technical documentation on CMAP's methodology, to replicate CMAP's work to the greatest extent possible. Only items that CMAP scripted in other software unavailable to CDM Smith were redeveloped in either Cube or Python. The trip tables resulting from the trip generation and trip distribution processes were compared to CMAP's ON TO 2050 trip tables to ensure that the impact of the independent socioeconomic forecast on final daily trips was reasonable.

4.2.2 Traffic Analysis Zones

For analytical purposes, travel demand models divide a large region into small areas of relatively homogenous characteristics, called TAZs. TAZs are the primary geographic unit of analysis used in the travel demand model. CDM Smith relied on the CMAP ON TO 2050 TAZ network, which was updated in 2019 from a total of 1,961 zones to 3,649 TAZs, providing a greater level of geographic detail. The current 3,649 zones include 17 external TAZs and 3,632 internal TAZs across a 21-county modeling area spanning northern Illinois, northwestern Indiana, and southeastern Wisconsin (see Figure 4-1).

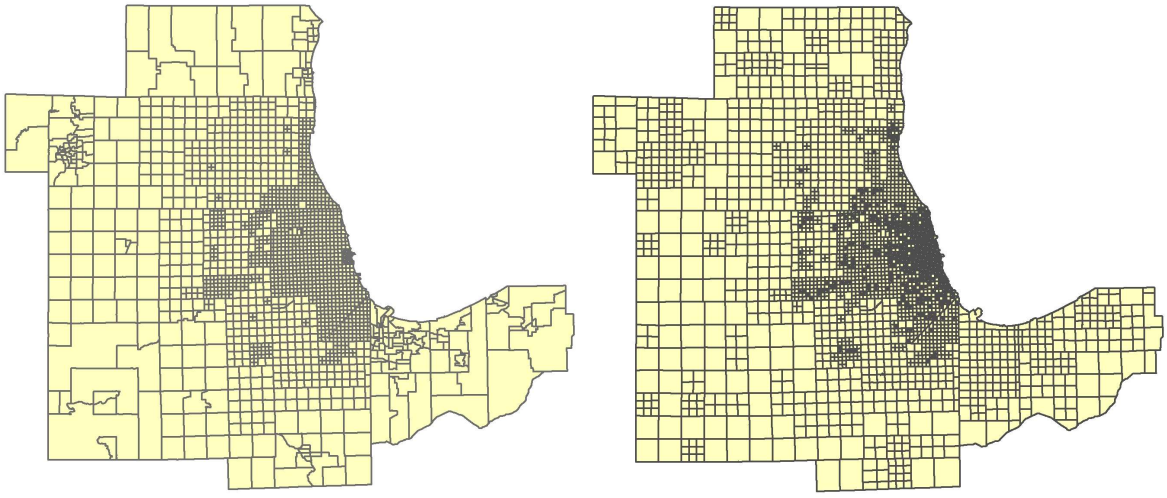


Figure 4-1. Former and Current Traffic Analysis Zone Networks in the Modeling Region

4.2.3 Highway Network

The model relies on a highway network to determine the routing of trips between origins and destinations. The highway network includes numerous attribute fields, such as distance, capacity, and speed limits, which are used in the routing calculations. CMAP publishes highway networks for 2015, 2020, 2030, 2040, and 2050, which were used as the primary input for the model's highway networks.

CDM Smith performed extensive network revisions and validation on the CMAP highway networks to include the fields necessary to perform toll diversion calculations. These revisions, which form the basis of toll transaction and revenue (T&R) forecasts, allow the model to better represent traffic movements on the Illinois Tollway system than the CMAP ON TO 2050 model.

In developing the highway networks, all the important link parameters inherited from the CMAP model, such as speed, capacity, number of lanes, and volume-delay function designations, were refined. CDM Smith also performed a review of regional transportation planning documents to ensure that the projects programmed in the long-range plan were included in the appropriate highway networks. Specific network improvements are discussed in detail in Chapter 5. Figure 4-2 portrays the overall extent of the highway network in the 2050 model year.

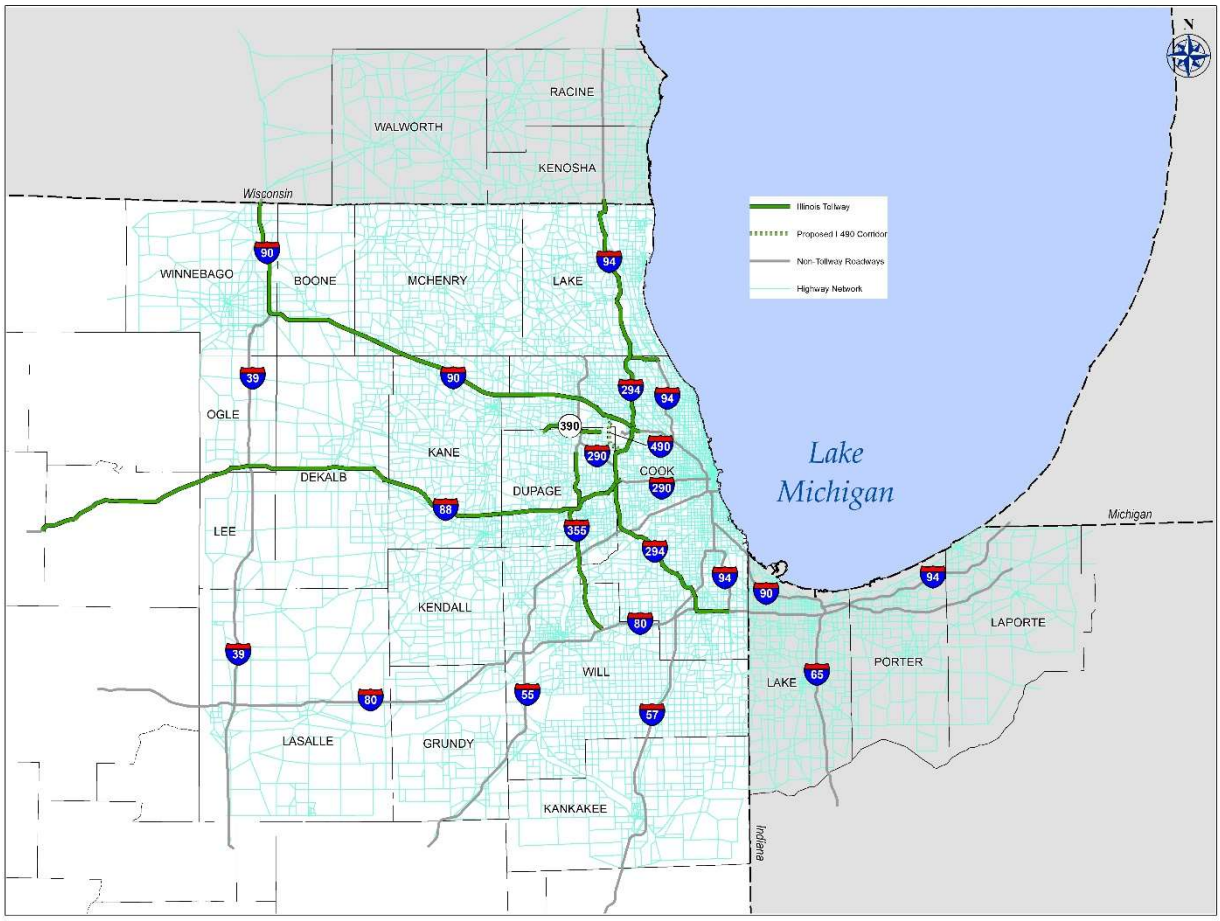


Figure 4-2. Highway Network in Model

4.2.4 Time Periods

To better represent variations between time periods within a day, the CMAP model divides daily trips into eight time periods, shown in Figure 4-3. Trips within each time period are further divided into four vehicle classes: PCs and three CV categories (light, medium, and heavy vehicles). The CMAP overnight time period (8:00 p.m. to 6:00 a.m.) does not match the Illinois Tollway's overnight CV toll rate discount period (10:00 p.m. to 6:00 a.m.). Long-term traffic and revenue forecasts are based on average daily traffic (ADT), so this difference in time periods is not

material; for other modeling applications, the difference in time periods is dealt with via post-processing.

Figure 4-3. Chicago Metropolitan Agency for Planning Modeling Time Periods

4.2.5 Value of Time

VOT is an important variable in the analysis of toll projects, which indicates the driver's willingness to pay in exchange for travel-time savings. Different methods were used to calculate the VOTs for PCs and CVs.

4.2.5.1 Passenger Car Value of Time

For PC drivers, the VOT is a function of the purpose of the trip, the time of day (e.g., peak versus off-peak), and the income of the driver. To develop VOT for the PC travelers in the study region, CDM Smith developed individual VOT estimates for each TAZ. The methodology involved using U.S. Census Bureau data to estimate wages per minute worked. Median household income was divided by the average number of hours worked per household and converted from dollars per hour to dollars per minute. The wage per minute was further adjusted by the share of different trip purposes (i.e., work commute trips, business trips, and other trips) at different time periods (i.e., peak, off-peak, and nighttime). A "perception weighting factor," reflecting travelers' VOT for those activities relative to their hourly wages, also was considered in the process. That calculation resulted in tract-level VOT estimates for the peak, off-peak, and nighttime periods. These tract-level VOT data then were converted to the TAZ level.

Table 4-1 shows the region-wide average PC VOTs by time period, calculated in 2017 dollars. Although the model utilized the TAZ-level VOTs, the regional VOTs provide an overall image of the VOT in the study area. CDM Smith has assumed that PC VOT will increase with historical consumer price index (CPI) up to 2020, and then it will inflate by 2.0 percent annually throughout the forecast period. This assumption of 2.0 percent is based on historical inflation rates experienced over the past 20 to 30 years, and it is the inflation target typically adopted by the Federal Reserve System.

Table 4-1. Passenger Car Value of Time by Time Period (2017 Dollars/Minute)

Time Period	VOT
Morning and Evening Peak Periods[a]	$0.24
Off-Peak Periods	$0.23
Nighttime Period	$0.20

[a] Includes pre-peak and post-peak periods

The VOT for CVs was determined using a Monte Carlo simulation conducted for CDM Smith's previous investment-grade study for the Illinois Tollway, completed in 2012. At that time, CDM Smith conducted an extensive review of published literature on CV VOT. From this review, four criteria stood out as important determinants of CV VOT. These four criteria, and the range of choices within each criterion, are shown in Table 4-2. The table also shows the market share of each choice within each of the four criteria. These values were obtained from the 2007 Commodity Flow Survey prepared by the United States Department of Transportation's Research and Innovative Technology Administration and the Census Bureau. The last two columns of the table indicate the average VOT and standard deviation among sources for each of the four criteria. As the table illustrates, the standard deviations are high, generally exceeding the average value themselves. This implies high variability among the sources. For this reason, it was not sufficient to simply use the average values.

Table 4-2. Commercial Vehicle Value of Time Criteria (2012 Dollars/Minute)

Criteria	Choices	Market Share	Average VOT	Standard Deviation
1. Type of Ownership	Private	21%	$0.87	$0.51
	For-Hire	79%	$1.20	$0.67
2. Length of Haul	Very Short (<50 miles)	10%	$0.47	$0.66
	Short (50–100 miles)	7%	$0.61	$0.86
	Medium (100–250 miles)	15%	$0.91	$1.27
	Very Long (250+ miles)	68%	$1.12	$1.57
3. Type of Load	Homogeneous	50%	$0.57	$0.92
	Heterogeneous	50%	$0.51	$0.57
4. Value of Cargo	Low Value	75%	$0.66	$0.92
	High Value	25%	$0.94	$1.32

Monte Carlo simulation of the aforementioned parameters was used to determine VOT for CVs. There are 32 different permutations on CV trips using the choices available in Table 4-2, and the share of each permutation is decided by the market share. Assuming VOTs follow a lognormal distribution, the mean and standard deviations shown in Table 4-2 are used to sample VOTs for each possible combination of choices decided by market share. To ensure that each of these 32 CV trip types had at least 100 samples, a total of 4,000 samples were drawn to estimate the median VOT for CVs.

Table 4-3 shows the median VOTs for light, medium, and heavy vehicles obtained from the Monte Carlo simulations and used in the toll diversion model. These VOTs were simply grown from the values previously used in the 2012 investment-grade study using CPI. As with the PC VOTs, CDM Smith has assumed CV VOT will increase with historical CPI up to 2020 and inflate by 2.0 percent per year throughout the forecast period.

Table 4-3. Commercial Vehicle Median Value of Time by Vehicle Type (2017 Dollars/Minute)

Commercial Vehicle Type	Illinois Tollway Rate Tier	VOT
Small	2[a]	$0.63
Medium	3[b]	$0.74
Large	4[c]	$0.74

[a] Single-unit truck or tractor, buses, two axles, six tires.
[b] Trucks with three or four axles, buses, and Class 1 vehicles with a one- or two-axle trailer.
[c] Trucks with five or six axles, miscellaneous PC special, or unusual vehicles not classified in Tiers 1, 2, or 3.

4.2.6 Vehicle Operating Costs

VOC is a cost parameter used in the model similar to VOT, except VOC is priced in units of distance (cents per mile) rather than time (cents per minute). The VOC includes ownership costs, such as vehicle maintenance and tires, but the primary cost component is fuel, which is dependent upon the average fuel efficiency of vehicles currently driven. This forecast relies on conservative assumptions, which consider operating costs for internal combustion engine vehicles only. The following assumptions were made in calculating VOCs for the Illinois Tollway model:

- **Gasoline Prices:** The average gasoline price for 2018 in the Chicago area was $2.91 per gallon. To estimate future fuel prices, CDM Smith obtained a national fuel price forecast from the U.S. Department of Energy through the year 2050 and applied the growth rates in the national forecast to the 2018 fuel price for the Chicago area.
- **Fuel Efficiency:** For PCs, CDM Smith began with an estimate of fuel efficiency for 2017–2018 using the ratio of the assumed cost of gas and average gas costs provided by the American Automobile Association's (AAA's) annual "Your Driving Costs" brochure. From there, fuel efficiency was assumed to improve based on national Corporate Average Fuel Economy (CAFE) standards set by the National Highway Traffic Safety Administration for the 2019–2025 period for PCs and light trucks. For 2026 and beyond, fuel efficiency values were estimated to grow at half of the increase in CAFE standards over the previous 10 years. For CVs, fuel costs come from the U.S. Energy Information Administration's projections in the Annual Energy Outlook 2019.
- **Maintenance, Repair, and Tire Cost:** For PCs, CDM Smith based these costs on AAA's annual cost-of-driving estimates. These estimates are provided for sedans and sport utility vehicle (SUV)/van types. The estimates were converted to estimates for PCs in the model based on the distribution of the respective vehicle types in the light vehicle fleet. The latter uses the 2017 National Household Travel's estimates for Illinois. For CVs, operating costs were based on the American Transportation Research Institute's "An Analysis of the Operational Costs of Trucking" released in September 2015. Values were grown using the Chicago area CPI. For PCs and CVs, CDM Smith assumed vehicle maintenance costs will increase in line with inflation.

Table 4-4 shows the VOC by vehicle type in nominal dollars.

Table 4-4. Vehicle Operation Costs by Vehicle Type and Year (Nominal Dollars per Mile)

Year	Rate Tier 1[a] Passenger Cars	Rate Tier 2[b] Small Trucks	Rate Tier 3[c] Medium Trucks	Rate Tier 4[d] Heavy Trucks
2017	$0.19	$0.41	$0.53	$0.63
2020	$0.22	$0.46	$0.60	$0.71
2025	$0.22	$0.51	$0.65	$0.79
2030	$0.24	$0.57	$0.71	$0.87
2040	$0.29	$0.70	$0.83	$1.04
2050	$0.35	$0.86	$1.02	$1.27

[a] Automobile, motorcycle, single-unit truck or tractor, two axles, four or fewer tires
[b] Single-unit truck or tractor, buses, two axles, six tires.
[c] Trucks with three or four axles, buses, and Class 1 vehicles with a one- or two-axle trailer.
[d] Trucks with five or six axles, miscellaneous PC special, or unusual vehicles not classified in Tiers 1, 2, or 3.

4.3 Toll Diversion Algorithm

A core component of CDM Smith's travel demand model is its use of a toll diversion algorithm. Toll diversion algorithms compare two alternative paths for each zone-to-zone travel movement, one using the toll road and an alternate using the best non-tolled route.

To estimate the share of traffic using tolled and untolled paths, CDM Smith developed a cost per minute saved (CPMS) toll diversion curve for the Tollway model. The basic CPMS approach computes the travel time savings of the tolled route over the untolled route, and then divides the toll charge by the number of minutes saved. This toll CPMS is then compared to the distribution of values of travel time. The proportion of the population with a VOT equal to or higher than the CPMS would be expected to select the toll path.

The basic CPMS approach is modified further in the Tollway model to account for the impact of travel distance. It is assumed that drivers are not sensitive to small differences in travel distance between a tolled path and an untolled path. However, once the differences in travel distances become more than 3 miles, it is assumed drivers will start considering the cost differential in their routing choice.

In addition to the use of the modified CPMS diversion method, the following three additional improvements were applied to enhance the toll diversion algorithm:

- **Queue accumulation to reflect congested travel time.** The free expressways connecting to the Chicago urban core, including I-290, I-90, I-94, and I-57, experience significant congestion. Customized volume-delay functions were developed to reflect congestion using the 2019 INRIX speed data.
- **Travel time reliability.** Travel time on arterials and congested untolled highways are less reliable than Tollway corridors due to factors such as accidents, signal delay, or driving conditions at night. INRIX speed data were used to estimate the travel time variation as a representation of travel reliability. Higher variation reflects less reliable travel times.
- **VOC on arterial roadways.** Operating cost on arterials is higher than on expressways because of lower posted speeds and the presence of signals. To account for this difference, the model uses an assumption that VOC on arterials is 30 percent higher than expressways.

4.4 Base-Year Trip Table Calibration

To ensure that the model represents base-year traffic patterns, the base-year trip tables were calibrated to the observed 2017 traffic volumes for each time period by PC and CV. The following sections describe the results of this calibration at screenline locations throughout the modeling region, as well as at the Tollway's plazas. Screenlines represent a summary of total traffic crossing an illustrative boundary line across multiple facilities.

4.4.1 Screenline Volume Calibration Results

Figure 4-4 shows the locations of the 30 traffic volume screenlines used to calibrate the base-year trip tables. Screenlines are located throughout the modeling region, with the largest number located in the core of the Tollway service area. Observed traffic volumes were assembled from

various sources, including the Federal Highway Administration's Highway Performance Monitoring System and Tollway plaza transaction data.

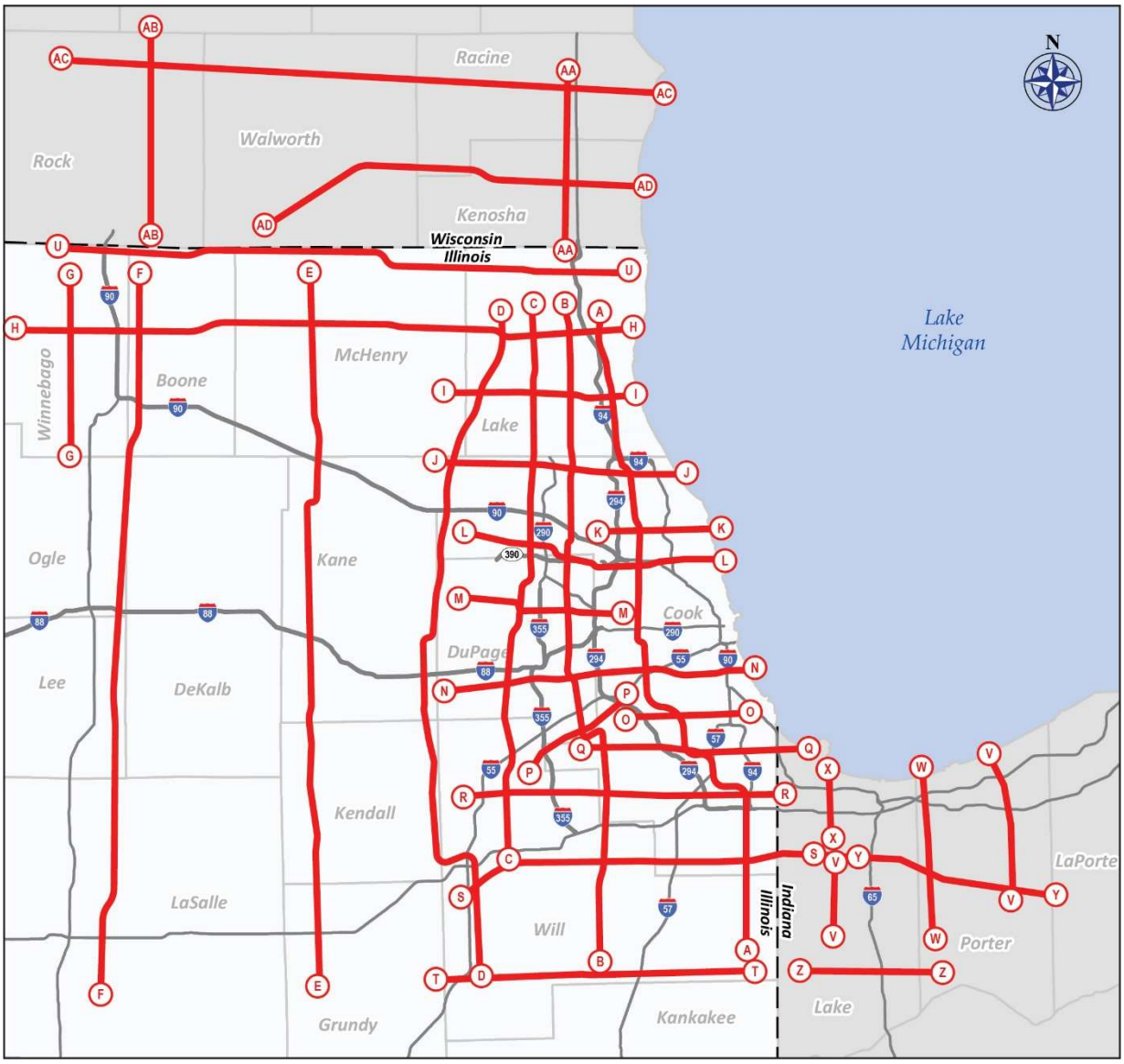


Figure 4-4. Location of Screenlines

While each time period was calibrated separately, Table 4-5 presents a daily summary of actual and model-assigned average weekday daily traffic (AWDT) volumes along these screenlines. Across screenlines, the total modeled AWDT was 1.1 percent higher than the actual counts. The average difference for screenlines was 1.2 percent, although they ranged from as little as a -0.1-percent difference (Screenline M) to as high as a 16.4-percent difference (Screenline AD). Screenlines with the largest variances tended to be located toward the edge of the modeling area.

Table 4-5. Screenline Traffic Volume Comparisons

Screenline	Model AWDT	Count AWDT	Percent Difference
A	1,641,822	1,638,672	0.2%
B	1,401,638	1,357,852	3.2%
C	1,235,053	1,217,929	1.4%
D	708,077	709,496	-0.2%
E	176,386	178,990	-1.5%
F	146,083	141,880	3.0%
G	121,252	129,332	-6.2%
H	388,297	390,201	-0.5%
I	322,514	306,219	5.3%
J	555,705	546,965	1.6%
K	464,275	459,666	1.0%
L	1,249,787	1,218,305	2.6%
M	647,949	648,782	-0.1%
N	1,173,189	1,162,111	1.0%
O	495,879	495,067	0.2%
P	349,847	348,736	0.3%
Q	690,246	681,227	1.3%
R	794,924	785,278	1.2%
S	306,258	310,267	-1.3%
T	93,370	90,633	3.0%
U	223,251	219,041	1.9%
V	182,522	183,938	-0.8%
W	165,717	154,379	7.3%
X	280,979	294,923	-4.7%
Y	158,743	155,935	1.8%
Z	11,925	11,416	4.5%
AA	40,412	36,200	11.6%
AB	25,109	27,101	-7.4%
AC	189,846	214,488	-11.5%
AD	182,384	156,682	16.4%
Total	14,423,439	14,271,711	1.1%

Figure 4-5 shows a scatterplot of the actual and modeled traffic volumes for the almost 800 count stations included in the 30 screenlines. Overall, the model calibration results in a close relationship between the two, with an R-squared value over 0.99.

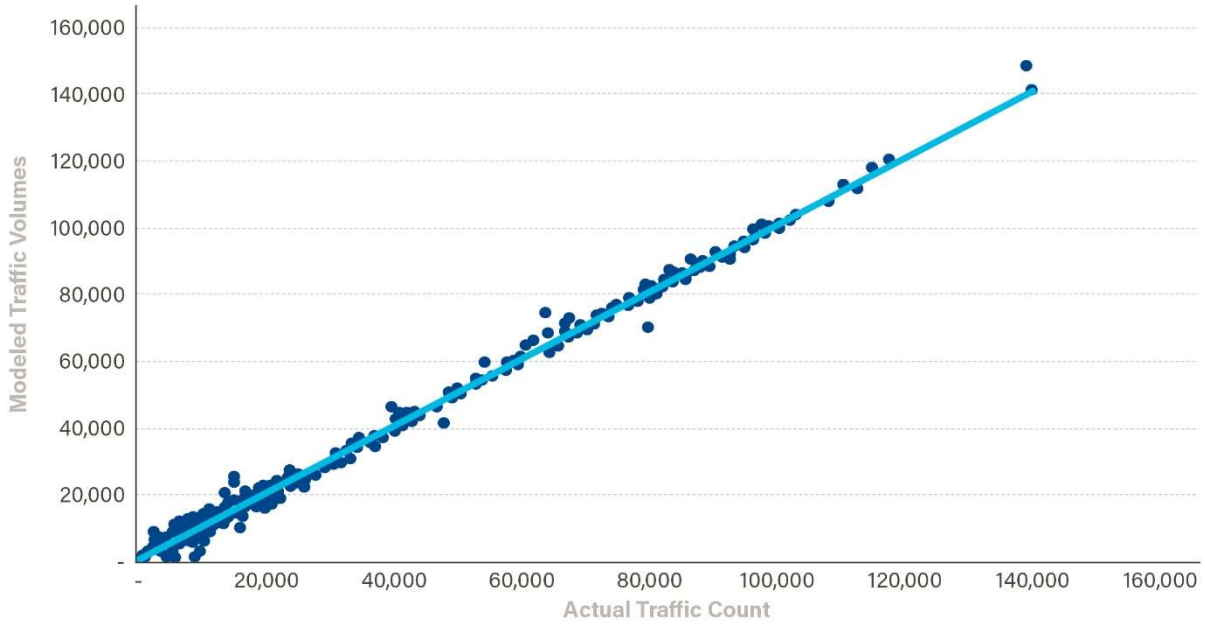


Figure 4-5. Screenline Calibration Results Actual vs. Modeled Traffic Volumes

4.4.2 Mainline Plaza Calibration

Transaction data were obtained for all toll plazas on the Illinois Tollway system. Comprehensive data are available for all hours in the year, by direction, vehicle payment tier, and payment method (cash or I-PASS). The toll plaza links were calibrated for each modeling time period and vehicle type.

Plaza-level results of the calibration are shown in Table 4-6. The calibrated model-assigned volumes were generally within 5.0 percent of actual AWDT volumes for mainline plazas across the daily, morning peak, and evening peak periods. The overall assignment across mainline plazas was within 1.0 percent across time periods. Plazas where deviation from counts was observed were adjusted for in the model post-processing stage to address the potential for over- or under-assignment of total traffic demand.

Table 4-6. Toll Plaza Calibration, Actual vs. Modeled Volumes

			DAILY			MORNING PEAK			EVENING PEAK		
Route	Toll Plaza	Plaza Number	Model Assignment	Actual Transactions	Percent Difference	Model Assignment	Actual Transactions	Percent Difference	Model Assignment	Actual Transactions	Percent Difference
I-90	South Beloit	1	52,274	55,982	-6.6%	5,823	5,960	-2.3%	7,540	8,222	-8.3%
I-90	Belvidere	5	21,968	22,082	-0.5%	2,309	2,287	0.9%	3,026	3,163	-4.3%
I-90	Marengo	7	23,204	24,094	-3.7%	2,752	2,759	-0.3%	2,891	3,015	-4.1%
I-90	Elgin	9	101,080	99,202	1.9%	13,112	12,939	1.3%	15,175	14,950	1.5%
I-90	Devon Avenue	17	94,108	94,828	-0.8%	11,925	11,895	0.3%	14,250	14,369	-0.8%
I-90	River Road	19	65,971	62,218	6.0%	8,909	7,945	12.1%	7,268	6,332	14.8%
I-94	Waukegan	21	78,457	80,739	-2.8%	9,576	9,628	-0.5%	10,945	11,488	-4.7%
I-94	Edens Spur	24	58,035	60,404	-3.9%	8,834	9,231	-4.3%	8,221	8,839	-7.0%
I-294	Touhy Avenue	29	107,269	108,042	-0.7%	15,780	16,350	-3.5%	14,971	15,186	-1.4%
I-294	Irving Park Road	33	119,637	117,563	1.8%	16,002	15,705	1.9%	16,090	15,124	6.4%
I-294	Cermak Road	35	164,308	164,609	-0.2%	19,577	19,802	-1.1%	19,636	19,604	0.2%
I-294	82nd Street	36	90,935	91,717	-0.9%	9,884	10,035	-1.5%	14,577	14,502	0.5%
I-294	83rd Street	39	89,363	88,685	0.8%	11,808	11,586	1.9%	10,526	10,707	-1.7%
I-294	163rd Street	41	115,103	115,664	-0.5%	13,425	13,256	1.3%	15,429	15,335	0.6%
I-88	York Road	51	100,214	99,175	1.0%	14,896	14,510	2.7%	14,537	14,094	3.1%
I-88	Meyers Road	52	97,570	97,265	0.3%	15,802	14,676	7.7%	12,702	12,964	-2.0%
I-88	Aurora	61	91,091	93,614	-2.7%	12,546	12,752	-1.6%	14,760	15,209	-2.9%
I-88	DeKalb	66	19,659	21,165	-7.1%	2,053	2,285	-10.2%	2,691	2,992	-10.0%
I-88	Dixon	69	14,080	14,935	-5.7%	1,318	1,445	-8.8%	1,856	2,033	-8.7%
I-355	Army Trail Road	73	126,525	129,871	-2.6%	19,463	20,313	-4.2%	19,787	20,640	-4.1%
I-355	Boughton Road	89	141,051	141,800	-0.5%	19,253	18,959	1.6%	22,288	22,946	-2.9%
I-355	Spring Creek	99	59,819	66,280	-9.7%	8,820	10,120	-12.8%	9,308	10,636	-12.5%
IL 390	Lively Boulevard	320	15,370	13,736	11.9%	2,582	2,063	25.2%	2,836	2,432	16.6%
IL 390	Mittel Drive	322	29,130	25,504	14.2%	4,625	4,013	15.3%	5,092	4,403	15.7%
IL 390	Hamilton Lakes Drive	324	27,931	27,457	1.7%	4,637	4,169	11.2%	5,205	4,793	8.6%

			DAILY			MORNING PEAK			EVENING PEAK		
Route	Toll Plaza	Plaza Number	Model Assignment	Actual Transactions	Percent Difference	Model Assignment	Actual Transactions	Percent Difference	Model Assignment	Actual Transactions	Percent Difference
IL 390	Plum Grove Road	326	64,626	63,489	1.8%	9,706	9,750	-0.5%	10,665	10,667	0.0%
IL 390	Mitchell Boulevard	328	59,950	60,455	-0.8%	9,057	9,318	-2.8%	10,205	10,491	-2.7%
IL 390	Lake Street	330	31,570	31,555	0.0%	4,698	4,845	-3.0%	5,570	5,579	-0.2%
Total			2,060,298	2,072,130	-0.6%	279,172	278,596	0.2%	312,358	314,688	-0.7%

Chapter 5

Transactions & Revenue Forecast

CDM Smith has updated the annual transaction and toll revenue (T&R) forecasts for the Illinois Tollway system for the years 2021 through 2050 based on the following assumptions related to construction impacts, facility expansion, and toll collection. The assumptions are presented in the following four sections:

- Basic Assumptions
- Planned Transportation Improvements
- Toll Rate Schedule
- Future I-PASS Participation Rates

Next, the approach to traffic and revenue forecast calculations is presented after the discussion of assumptions. The section closes with the T&R forecast and a disclaimer statement.

5.1 Basic Assumptions

Traffic and toll revenue forecasts for the Illinois Tollway system are based on the following assumptions:

- Tolls will continue to be collected under the rate structure currently in effect.
- Cash is no longer collected on the Illinois Tollway. Current methods of payment via transponder, Pay By Plate, or mailed invoice will remain in place throughout the life of the forecast.
- Move Illinois will be implemented as scheduled. Major elements of the improvement program are shown with the assumed construction schedule in the Planned Transportation Improvements section of this report.
- Non-Illinois Tollway regional transportation network improvements will be implemented in accordance with the schedule shown in the Planned Transportation Improvements section of this report. No significant capacity will be added to the competing highway or transit systems beyond those improvements already programmed.
- Motor fuel will remain in adequate supply and future increases in fuel prices will not substantially exceed the overall rate of inflation over the long term. Average fuel efficiency will not dramatically increase during this period.
- No local, regional, or national emergency will arise that will restrict use of motor vehicles.
- Economic growth and development will occur generally, as presented previously in this report, and as implemented in the Illinois Tollway travel demand models.
- No major recession or significant economic restructuring will occur that would substantially reduce traffic in the region, other than the potential economic impacts described in this report related to the COVID-19 pandemic.

- The COVID-19 pandemic's impact on traffic and revenue performance is assumed to be largely resolved by Spring 2022 with lingering economic impacts.
- The long-term impacts of the COVID-19 pandemic on travel habits, land use, and other factors that affect the historical demand profile for the region are unknown at this time. The CDM Smith base-case forecast reflects the impacts of the current pandemic, with no adjustments made for long-term travel patterns.

Any significant departure from the aforementioned basic assumptions could materially affect the forecasts for traffic and gross toll revenue on the Illinois Tollway system presented in this report.

The widespread adoption of social distancing measures during the COVID-19 pandemic is expected to contribute to long-term changes in passenger car travel behavior, due to higher rates of telecommuting in the future and delayed overall traffic growth. These impacts are assumed to dampen passenger traffic volumes in the second half of 2022 by approximately 6.7 percent. In total, passenger car transaction volumes are expected to be slightly below 2019 volumes in 2022 (0.3 percent below). Beyond 2022, growth rates are expected to remain similar to previous expectations.

In contrast, the COVID-19 pandemic is not expected to have a lasting effect on commercial vehicle traffic. Following unusually high truck traffic in late 2020 and 2021 to date, due to a shift in personal consumption from services to goods during the pandemic, commercial vehicle levels are expected to return to previously expected levels by the second quarter of 2022. Beyond 2022, commercial vehicles are expected to grow in line with previous expectations.

5.2 Planned Transportation Improvements

Over time, assumptions of future improvements to the regional highway network impact the distribution of capacity and, correspondingly, affect routing decisions for trips in the travel demand model. This section describes the assumptions for future transportation improvements used in the development of the traffic and revenue forecast. The major transportation investments listed in this sub-section are reflected in the model's highway network and are current as of the time of publication.

5.2.1 Illinois Tollway Projects

Over the next six years, under the Move Illinois program, two significant improvement projects are planned: the completion of the IL 390 and I-490 Tollways, and the Central Tri-State (I-294) reconstruction and widening.

Future construction and expansion projects, planned for the existing system of the Illinois Tollway and assumed to impact T&R, are shown in Table 5-1. Major expansion projects include the I-490 Tollway, phase 2 of the new Tri-State Tollway (I-294)/I-57 Interchange Project, the widening and reconstruction of the Central Tri-State, new I-294 northbound exit and entrance ramps at Archer Avenue/Cork Avenue, and a new I-294 southbound exit ramp at County Line Road/U.S. Route 20/Illinois Route 64. In addition to expansion projects, several planned construction projects are assumed to impact T&R. Significant construction impacts are also expected to occur between 2021 and 2026 as a result of the rehabilitation work on the Reagan Memorial Tollway (I-88) and the I-294 reconstruction and widening.

Table 5-1. Planned Transportation Improvements—Illinois Tollway

Route	Type of Improvement	Project Details	Limits		2021	2022	2023	2024	2025	2026	2027
			From	To							
I-94	Bridge Rehabilitation	Stearns School Road Bridge	-	-	△						
I-94	Rehabilitation	Pavement and Structural Rehabilitation, 6.6 miles	Atkinson Road	Half Day Road		△					
I-294	Reconstruction	Reconstruct BNSF Bridge over Tollway	-	-	△	●					
I-294	Bridge Rehabilitation	Archer Avenue Bridge	-	-	△	●					
I-294	Interchange construction	Completion of I-294 interchange with I-57	-	-			●				
I-294	Rehabilitation	Rehab and widen 1.5 miles pavement	Wolf Road	O'Hare Oasis	△	△	●				
I-294	Reconstruction	Reconstruct and widen 2.5 miles pavement	Grand Avenue	Wolf Road	△	△	△	●			
I-294	Reconstruction	Reconstruct and widen 1.5 miles pavement	St. Charles Rd	Grand Avenue	△	△	△	●			
I-294	Reconstruction	Reconstruct and widen existing 3 miles pavement	Cermak Mainline	St. Charles Rd	△	△	△	△	△	△	●
I-294	Reconstruction	Reconstruct and widen existing 2 miles pavement	Ogden Ave	Cermak Mainline			△	△	△	●	
I-294	Reconstruction	Reconstruct and widen existing 4.3 miles pavement	I-55	Ogden Ave	△	△	△	△	△	●	
I-294	Reconstruction	Reconstruct and widen mainline and bridge over I-55	MP 22.9	MP 24.0	△	△	●				
I-294	Reconstruction	Reconstruct and widen existing 2 miles pavement	75th Street	I-55 Bridge (MP 22.9)	△	△	●				
I-294	Reconstruction	Reconstruct and widen Mile-Long Bridge	La Grange Rd	75th Street	△	△	●				
I-294	Reconstruction	Reconstruct and widen existing 3.5 miles pavement	95th St	La Grange Rd	△	△	●				
I-294	Interchange construction	SB exit ramp to County Line Rd/US 20/IL 64	-	-			●				
I-294	Interchange construction	NB entrance ramp from Archer Avenue								●	
I-88	Rehabilitation	Rehabilitate existing 5.5 miles pavement	Aurora Plaza	IL 59	△	●					
I-88	Bridge Rehabilitation	Deerpath Road Bridge	-	-	△	●					
I-88	Bridge Rehabilitation	Windsor Bridge over East-West Connector Ramps	-	-	△	●					
I-90	Interchange construction	Full interchange at I-90 and I-490	-	-	△	△				●	
IL 390	Rehabilitation	Structural Rehabilitation	Lake Street	Lively Boulevard		△					

Route	Type of Improvement	Project Details	Limits		2021	2022	2023	2024	2025	2026	2027
			From	To							
I-490	New Tollway Construction	I-490 between Franklin Avenue and I-294	Franklin Ave	I-294						●	
IL 390	New Tollway Construction	Western Access Ramps between IL 390 and O'Hare Airport	-	-						●	
I-490	New Tollway Construction	I-490 North Extension	IL 390	I-90						●	
IL 390/ I-490	New Tollway Construction	IL 390/I-490 Extension to IL 19	IL 83	IL 19							●
I-490	New Tollway Construction	I-490 South Extension	IL 19	Franklin Ave							●

△ Construction Impacts ● Opening Year

5.2.2 Other Agency Projects

Considering off-system projects, CDM Smith reviewed the long-range transportation plans for the Illinois Department of Transportation and Wisconsin Department of Transportation to identify which projects will have a likely impact on the Illinois Tollway T&R. These projects are listed in Table 5-2. CDM Smith also reviewed the upcoming construction schedules for the Cook County Department of Transportation and Highways and the DuPage County Division of Transportation, as well as those for municipalities surrounding the IL 390 and I-490 projects. None of the planned county or municipal projects is expected to have a measurable effect on Illinois Tollway traffic demand or revenue.

Table 5-2. Planned Transportation Improvements—Other Agencies

State	Opening Year	Route	Project
Illinois	2023	I-90/I-94/I-290	Reconstruct Jane Byrne interchange
	2025	IL 56	Add lanes between IL 53 and I-355
	2030	I-55	Convert the inside shoulders to managed lanes between I-355 and I-90/94
Wisconsin	2022	I-39/90	Add one lane in both directions from Madison to Illinois State line

5.3 Toll Rate Schedule

Assumptions of future toll rates are a critical input in developing long-term revenue forecasts. Not only are toll rates used to calculate revenue forecasts, they are also part of the cost functions used in the model to determine routing decisions for trips. Historic and current toll rates, as well as the Tollway's overall toll structure, are discussed in greater detail in Section 1.6. This section discusses assumptions for future toll rates through the year 2050.

5.3.1 Passenger Car Toll Rates

PC toll rates increased 88 percent on January 1, 2012, for both cash and I-PASS customers. No further toll rate increases for PCs are currently planned. Therefore, the PC toll rates are identical in all model years through 2050. A full toll rate schedule is provided in Appendix A.

5.3.2 Commercial Vehicle Toll Rates

In 2018, the toll rates for CVs—Rate Tiers 2, 3, and 4—began annual increases at the rate of inflation. Actual CV rates increased by 1.84, 2.25, 2.07, and 1.56 percent in 2018, 2019, 2020, and 2021, respectively. In 2022, commercial vehicle rates are set to increase by an additional 2.30 percent. For the purposes of this study, CDM Smith assumes CV toll rates will increase 2.0 percent per year between 2022 and 2050 and will take effect annually on January 1 of each year beginning January 1, 2023. The future-year inflation assumption of 2.0 percent is based on the long-run historical average. All future CV toll rates are assumed to be rounded to the nearest multiple of $0.05.

5.4 Future I-PASS Participation Rates

As discussed in Chapter 1, recent growth in I-PASS participation rates can be attributed largely to the opening of new facilities and access points in high I-PASS participation areas. I-PASS participation at existing facilities has generally been trending toward flat or low growth. For this study, CDM Smith has assumed that the PC I-PASS participation rates will continue to remain flat, consistent with 2019 performance, at a plaza level, as shown in Table 5-3.

Table 5-3. Passenger Car I-PASS Rate Assumption

Year	Systemwide Tolls Paid at I-PASS Rate
2021	88.7%
2022	89.4%
2023-2025	89.5%
2026	89.6%
2027	89.7%
2028-2050	89.8%

Between 2021 and 2025, the proportion of PC transactions expected to be paid at the I-PASS rate is anticipated to remain flat at the 2019 rate of 89.5 percent. In 2026 and 2027, the I-PASS rate is expected to increase to 89.7 and 89.8 percent, respectively, following the completion of the I-490 Tollway and the Central Tri-State reconstruction and widening. It then is expected to remain at that rate through 2050.

Because CVs have no toll rate differential between cash and I-PASS on the Jane Addams Memorial (I-90), Tri-State (I-94/I-294/I-80), Reagan Memorial (I-88), and Veterans Memorial (I-355) Tollways, the I-PASS participation rate has no bearing on CV revenues for these routes. Therefore, no assumptions have been made about future CV I-PASS payment rates for these routes. CVs do have a toll rate differential between the non-I-PASS (i.e., Pay By Plate and invoicing rates) and I-PASS on the IL 390 Tollway. CDM Smith has assumed that the CV I-PASS rate on IL 390 will remain at the estimated 2018–2019 rate of 93.5 percent for all future-year forecasts. For I-490, CDM Smith assumes a slightly higher pay online rate of 95.0 percent.

Additionally, the Tollway announced on February 25, 2021, that the temporary suspension of cash collections initiated at the onset of the COVID-19 pandemic in March 2020 would be made permanent. This followed the launch of the TOLLING 2020 initiative on June 25, 2020, which established a new invoicing process to increase collection of unpaid tolls before nonpayment

reaches the violation process. The TOLLING 2020 initiative also established a new Pay By Plate toll payment option, which began in late July 2020.

CDM Smith forecasts expected revenues, not collected revenues. The suspension of cash collections, as well as new toll payment options established under the TOLLING 2020 initiative, are not anticipated to impact expected revenue forecasts, but may impact collected revenues. CDM Smith's forecast of expected revenue does not account for evaded tolls or recovery efforts, and so the TOLLING 2020 initiative does not impact our forecast. Please refer to the main body of the Official Statement, including the sub-sections "Toll Collections," "Pro Forma Debt Service Coverage," and "Certain Risk Factors," for information on toll evasion and evasion recovery.

5.5 Revenue Estimation Approach

The travel demand model output expresses traffic and revenue forecasts for a typical weekday, also referred to as average weekday traffic (AWDT). This does not take into account seasonal variations, recurring holidays, and weekend volumes. As such, an "annualization procedure" was used to convert the weekday values into annual traffic and revenue values. Annualization factors were calculated for each direction of each toll plaza (both mainline and ramp plazas). The factors were calculated separately for each of the four vehicle rate tiers: PCs, small trucks, medium trucks, and large trucks. The factors were calculated using Illinois Tollway 2019 transaction data. The following numbered list shows the steps required to calculate the plaza-level factors.

1. Calculate ratio between AWDT and average annual daily traffic (AADT):
    a. Extract daily transactions at each plaza by direction and rate tier.
    b. Obtain AADT volume by calculating average of all days of the year.
    c. Obtain AWDT volume by calculating average of Monday through Friday transactions (excluding holidays that occur on a weekday).
    d. Divide AWDT volume by the AADT volume.
2. Multiply AWDT-to-AADT ratio by 365 (or 366 for leap years) to obtain "annualization factor" by plaza, direction, and rate tier.
3. Multiply model output by "annualization factor" to obtain annual transactions.

5.6 Annual Transaction and Toll Revenue Forecasts

Model runs were performed for milestone years 2020, 2030, 2040, and 2050. Transaction growth then was interpolated at a plaza level for all years in between. In addition, a series of 2025 model runs were conducted to analyze the impacts of the opening of major capital expansion projects included in the Move Illinois program between now and 2027. For that effort, model runs used a set of 2025 highway networks, providing a series of impacts that were applied based on the latest capital program schedule.

Future-year traffic assignments were developed using the modeling approach detailed in Chapter 4, and in accordance with the assumptions listed previously in this chapter. The average weekday traffic and revenue forecasts produced by the toll diversion model were converted to annual values using the annualization procedure described in the previous sub-section.

Table 5-4 through Table 5-10 show annual T&R forecasts for each Illinois Tollway facility between 2021 and 2050. Each table provides T&R by PCs and CVs separately, as well as the total T&R. T&R are shown as annual totals, in thousands. Revenues are expected revenues, which do not account for evaded tolls or recovery efforts.

On a systemwide basis, annual toll transactions are expected to increase from approximately 939 million in 2021 to more than 1.39 billion in 2050, representing an average annual rate of growth of 1.4 percent per year. Expected toll revenue is forecasted to be $1.48 billion for 2021. This is forecasted to grow to $2.76 billion by 2050, at an average annual growth rate of 2.2 percent per year.

Figure 5-1 illustrates forecasted T&R from 2021 through 2050. In 2022, revenue is expected to increase by 3.9 percent as traffic volumes continue to recover from the impact of the pandemic. Between 2022 and 2027, average annual revenue growth is forecasted at 3.1 percent. Growth will be boosted by the completion of the I-490 Tollway in late 2026, as well as by the completion of the I-294 reconstruction and widening project in phases between 2022 and 2027. Beyond 2027, expected revenue is forecasted to grow at an average annual rate of 1.9 percent.

The share of revenue collected from CVs is forecast to increase over time because of the annual inflation-based toll rate adjustments. CV revenues are expected to consistently exceed PC revenues by 2024. The previous 2005 CV rate increase, 2012 PC rate increase, and 2015 through 2017 CV rate increases demonstrate that Illinois Tollway users have a relatively low sensitivity to toll rate increases. The year-over-year declines in transactions following these toll rate increases, if any, were minor and short-lived. One potential risk to the CV revenue forecast is if annual rate adjustments fall significantly below the assumed annual rate increase of 2.0 percent beyond 2021.

Table 5-4. 2021–2050 Systemwide Total Transactions and Revenue (in Thousands, Revenue Shown in Nominal Dollars)

Year	Transactions			Revenue		
	Passenger Cars	Commercial Vehicles	Total	Passenger Cars	Commercial Vehicles	Total
2021	810,256	128,749	939,005	709,592	771,398	1,480,990
2022	898,189	127,443	1,025,632	770,177	768,531	1,538,709
2023	920,427	127,852	1,048,279	786,414	785,990	1,572,405
2024	941,597	130,915	1,072,512	803,122	820,374	1,623,497
2025	948,612	131,821	1,080,434	808,856	843,471	1,652,327
2026	1,010,778	138,886	1,149,664	841,751	889,524	1,731,276
2027	1,046,604	144,573	1,191,178	862,476	928,345	1,790,821
2028	1,062,959	147,022	1,209,982	873,984	959,240	1,833,224
2029	1,069,122	147,938	1,217,060	878,646	984,137	1,862,783
2030	1,078,364	149,256	1,227,620	885,794	1,013,605	1,899,399
2031	1,087,091	150,487	1,237,578	892,693	1,042,235	1,934,928
2032	1,098,923	152,147	1,251,070	902,117	1,073,574	1,975,691
2033	1,104,756	152,987	1,257,743	906,652	1,102,891	2,009,543
2034	1,113,709	154,256	1,267,965	913,719	1,131,769	2,045,488
2035	1,122,782	155,537	1,278,320	920,870	1,165,480	2,086,350
2036	1,135,079	157,262	1,292,341	930,633	1,202,637	2,133,270
2037	1,141,297	158,140	1,299,436	935,425	1,231,269	2,166,694
2038	1,150,741	159,461	1,310,202	942,832	1,267,063	2,209,896
2039	1,160,314	160,795	1,321,109	950,328	1,301,550	2,251,878
2040	1,173,221	162,587	1,335,808	960,522	1,343,303	2,303,825
2041	1,174,359	163,405	1,337,764	961,330	1,376,035	2,337,365
2042	1,178,727	164,680	1,343,406	964,766	1,415,484	2,380,250
2043	1,183,119	165,967	1,349,086	968,220	1,454,430	2,422,650
2044	1,190,791	167,726	1,358,516	974,340	1,500,463	2,474,803
2045	1,191,980	168,581	1,360,561	975,184	1,536,998	2,512,182
2046	1,196,449	169,907	1,366,356	978,694	1,579,267	2,557,960
2047	1,200,943	171,247	1,372,190	982,222	1,624,031	2,606,253
2048	1,208,766	173,073	1,381,839	988,456	1,675,029	2,663,486
2049	1,210,010	173,967	1,383,977	989,337	1,715,639	2,704,976
2050	1,214,583	175,348	1,389,930	992,923	1,763,915	2,756,838

Table 5-5. 2021–2050 Jane Addams Memorial Tollway (I-90) Transactions and Revenue (in Thousands, Revenue Shown in Nominal Dollars)

Year	Transactions			Revenue		
	Passenger Cars	Commercial Vehicles	Total	Passenger Cars	Commercial Vehicles	Total
2021	185,673	26,554	212,227	150,420	171,641	322,061
2022	199,453	25,720	225,173	158,863	168,187	327,050
2023	201,016	25,915	226,930	159,388	172,556	331,944
2024	204,285	26,285	230,570	161,737	178,596	340,332
2025	205,932	26,367	232,299	163,070	182,915	345,985
2026	208,962	26,543	235,505	165,412	187,944	353,355
2027	212,063	26,345	238,409	167,198	190,735	357,933
2028	214,651	26,658	241,309	169,252	196,847	366,099
2029	216,088	26,829	242,917	170,386	202,258	372,643
2030	218,135	27,076	245,211	171,980	208,377	380,357
2031	219,925	27,303	247,227	173,443	214,370	387,813
2032	222,341	27,606	249,948	175,375	221,103	396,478
2033	223,463	27,762	251,224	176,315	227,187	403,502
2034	225,223	27,995	253,218	177,751	233,327	411,077
2035	227,015	28,230	255,245	179,205	240,359	419,565
2036	229,466	28,546	258,011	181,172	247,965	429,137
2037	230,695	28,708	259,403	182,174	254,230	436,404
2038	232,585	28,950	261,535	183,689	261,681	445,370
2039	234,507	29,195	263,702	185,224	268,948	454,171
2040	237,111	29,523	266,634	187,288	277,581	464,869
2041	237,570	29,686	267,257	187,694	284,670	472,364
2042	238,685	29,933	268,618	188,614	293,101	481,715
2043	239,806	30,183	269,989	189,539	301,438	490,977
2044	241,595	30,518	272,113	190,990	310,984	501,974
2045	242,071	30,690	272,761	191,408	318,998	510,406
2046	243,214	30,948	274,162	192,351	328,043	520,394
2047	244,365	31,209	275,574	193,300	337,555	530,855
2048	246,197	31,559	277,756	194,784	348,319	543,103
2049	246,690	31,740	278,430	195,216	357,332	552,548
2050	247,864	32,009	279,874	196,186	367,557	563,744

Table 5-6. 2021–2050 Tri-State Tollway (I-94/294/80) Transactions and Revenue (in Thousands, Revenue Shown in Nominal Dollars)

Year	Transactions			Revenue		
	Passenger Cars	Commercial Vehicles	Total	Passenger Cars	Commercial Vehicles	Total
2021	303,112	63,940	367,052	274,437	379,996	654,433
2022	337,242	64,516	401,758	299,904	386,502	686,406
2023	353,644	64,649	418,293	313,766	396,292	710,058
2024	367,511	66,802	434,313	325,045	417,234	742,279
2025	370,461	67,150	437,611	327,824	428,346	756,171
2026	387,258	70,392	457,650	340,608	457,239	797,846
2027	397,358	72,324	469,683	348,586	478,480	827,066
2028	401,246	72,995	474,241	351,967	492,286	844,253
2029	402,967	73,271	476,238	353,534	504,037	857,571
2030	405,811	73,749	479,561	356,038	518,607	874,645
2031	408,227	74,215	482,442	358,330	532,370	890,699
2032	411,786	74,889	486,675	361,583	547,510	909,092
2033	413,114	75,157	488,271	362,909	561,888	924,797
2034	415,587	75,633	491,220	365,237	575,432	940,669
2035	418,078	76,113	494,192	367,584	592,099	959,683
2036	421,742	76,806	498,548	370,960	610,252	981,212
2037	423,121	77,083	500,204	372,338	623,736	996,074
2038	425,672	77,573	503,246	374,744	641,078	1,015,822
2039	428,244	78,067	506,311	377,171	657,506	1,034,677
2040	432,016	78,780	510,796	380,653	677,717	1,058,370
2041	431,880	79,023	510,903	380,609	693,076	1,073,684
2042	432,929	79,484	512,413	381,605	712,012	1,093,618
2043	433,981	79,949	513,930	382,606	730,300	1,112,906
2044	436,230	80,637	516,867	384,657	752,324	1,136,981
2045	436,099	80,887	516,986	384,621	769,190	1,153,811
2046	437,163	81,361	518,524	385,635	789,003	1,174,639
2047	438,232	81,838	520,070	386,654	810,119	1,196,773
2048	440,509	82,544	523,052	388,734	834,258	1,222,992
2049	440,382	82,802	523,184	388,704	852,757	1,241,462
2050	441,463	83,288	524,752	389,683	875,468	1,265,150

Table 5-7. 2021–2050 Reagan Memorial Tollway (I-88) Transactions and Revenue (in Thousands, Revenue Shown in Nominal Dollars)

Year	Transactions			Revenue		
	Passenger Cars	Commercial Vehicles	Total	Passenger Cars	Commercial Vehicles	Total
2021	119,759	14,213	133,972	107,136	106,360	213,496
2022	136,236	13,819	150,055	118,235	103,772	222,007
2023	136,696	13,899	150,595	118,063	106,482	224,545
2024	138,212	14,158	152,370	119,225	110,568	229,793
2025	138,577	14,401	152,978	119,584	114,507	234,091
2026	141,532	14,913	156,445	122,018	120,234	242,252
2027	142,768	15,298	158,066	123,064	125,518	248,582
2028	143,906	15,510	159,416	124,089	129,790	253,879
2029	144,264	15,639	159,903	124,431	133,564	257,995
2030	145,021	15,813	160,835	125,111	137,869	262,980
2031	145,948	15,966	161,913	125,918	141,939	267,857
2032	147,285	16,164	163,449	127,067	146,444	273,510
2033	147,825	16,275	164,101	127,540	150,522	278,063
2034	148,776	16,433	165,209	128,366	154,872	283,239
2035	149,736	16,592	166,328	129,199	159,551	288,751
2036	151,118	16,799	167,916	130,394	164,905	295,299
2037	151,682	16,915	168,597	130,888	169,065	299,953
2038	152,668	17,080	169,747	131,743	174,186	305,929
2039	153,663	17,246	170,908	132,607	179,216	311,823
2040	155,090	17,461	172,551	133,841	185,233	319,074
2041	155,115	17,570	172,684	133,879	189,935	323,814
2042	155,565	17,727	173,292	134,281	195,581	329,862
2043	156,017	17,887	173,904	134,685	201,142	335,827
2044	156,899	18,098	174,998	135,459	207,736	343,195
2045	156,927	18,212	175,139	135,499	212,982	348,481
2046	157,385	18,377	175,762	135,908	219,150	355,058
2047	157,845	18,545	176,389	136,319	225,608	361,927
2048	158,740	18,765	177,505	137,104	232,919	370,023
2049	158,771	18,885	177,655	137,146	238,820	375,966
2050	159,237	19,058	178,294	137,551	245,882	383,433

Table 5-8. 2021–2050 Veterans Memorial Tollway (I-355) Transactions and Revenue (in Thousands, Revenue Shown in Nominal Dollars)

Year	Transactions			Revenue		
	Passenger Cars	Commercial Vehicles	Total	Passenger Cars	Commercial Vehicles	Total
2021	138,748	16,188	154,936	152,034	102,141	254,175
2022	153,700	15,696	169,395	164,829	99,559	264,388
2023	156,534	15,458	171,992	166,595	99,199	265,794
2024	157,812	15,614	173,426	167,773	102,164	269,937
2025	158,660	15,766	174,426	168,832	105,419	274,250
2026	157,808	15,391	173,199	167,727	104,441	272,168
2027	158,499	15,095	173,594	168,535	104,307	272,842
2028	159,669	15,271	174,940	169,811	107,603	277,414
2029	160,285	15,364	175,649	170,579	110,423	281,001
2030	161,346	15,500	176,846	171,851	113,723	285,574
2031	162,515	15,642	178,157	173,197	117,117	290,314
2032	164,144	15,829	179,973	175,042	120,859	295,901
2033	164,889	15,930	180,820	175,959	124,326	300,285
2034	166,096	16,077	182,172	177,367	127,821	305,188
2035	167,315	16,225	183,539	178,792	131,773	310,565
2036	169,009	16,419	185,428	180,725	136,129	316,854
2037	169,793	16,525	186,318	181,690	139,609	321,299
2038	171,052	16,677	187,729	183,164	143,825	326,989
2039	172,324	16,832	189,156	184,655	148,065	332,721
2040	174,086	17,034	191,120	186,672	152,991	339,662
2041	174,141	17,151	191,292	186,774	157,196	343,970
2042	174,674	17,317	191,991	187,387	162,020	349,406
2043	175,209	17,485	192,694	188,002	167,055	355,057
2044	176,228	17,703	193,931	189,135	172,782	361,917
2045	176,286	17,827	194,113	189,241	177,524	366,765
2046	176,828	18,000	194,829	189,865	182,919	372,784
2047	177,373	18,176	195,549	190,492	188,620	379,111
2048	178,408	18,404	196,812	191,643	195,051	386,694
2049	178,471	18,533	197,004	191,754	200,357	392,111
2050	179,024	18,715	197,739	192,380	206,527	398,907

Table 5-9. 2021–2050 Illinois Route 390 Tollway (IL 390) Transactions and Revenue (in Thousands, Revenue Shown in Nominal Dollars)

Year	Transactions			Revenue		
	Passenger Cars	Commercial Vehicles	Total	Passenger Cars	Commercial Vehicles	Total
2021	62,963	7,855	70,818	25,566	11,259	36,825
2022	71,558	7,692	79,250	28,346	10,511	38,857
2023	72,537	7,932	80,469	28,602	11,462	40,064
2024	73,778	8,056	81,833	29,342	11,813	41,155
2025	74,983	8,137	83,120	29,546	12,284	41,830
2026	95,578	9,709	105,287	35,008	14,299	49,307
2027	103,030	10,625	113,655	36,927	15,754	52,681
2028	104,756	10,807	115,562	37,503	16,306	53,809
2029	105,931	10,932	116,862	37,886	16,763	54,649
2030	107,414	11,088	118,502	38,412	17,293	55,705
2031	108,867	11,234	120,100	38,877	17,982	56,859
2032	110,643	11,412	122,055	39,464	18,495	57,959
2033	111,836	11,530	123,366	39,849	19,148	58,997
2034	113,352	11,682	125,034	40,348	19,746	60,094
2035	114,890	11,835	126,725	40,852	20,398	61,250
2036	116,769	12,023	128,792	41,475	21,186	62,661
2037	118,033	12,148	130,180	41,882	21,753	63,635
2038	119,638	12,307	131,945	42,407	22,533	64,939
2039	121,266	12,469	133,735	42,938	23,208	66,146
2040	123,255	12,667	135,922	43,595	24,187	67,782
2041	123,657	12,764	136,421	43,717	24,737	68,454
2042	124,401	12,896	137,298	43,959	25,462	69,421
2043	125,150	13,031	138,181	44,202	26,206	70,408
2044	126,249	13,202	139,451	44,567	27,179	71,745
2045	126,663	13,303	139,966	44,692	27,901	72,593
2046	127,426	13,441	140,867	44,939	28,668	73,607
2047	128,194	13,581	141,776	45,187	29,536	74,723
2048	129,321	13,761	143,081	45,559	30,614	76,173
2049	129,745	13,866	143,611	45,687	31,429	77,116
2050	130,528	14,011	144,539	45,948	32,203	78,151

Table 5-10. 2021–2050 I-490 Tollway (I-490) Transactions and Revenue (in Thousands, Revenue Shown in Nominal Dollars)

Year	Transactions			Revenue		
	Passenger Cars	Commercial Vehicles	Total	Passenger Cars	Commercial Vehicles	Total
2021	0	0	0	0	0	0
2022	0	0	0	0	0	0
2023	0	0	0	0	0	0
2024	0	0	0	0	0	0
2025	0	0	0	0	0	0
2026	19,640	1,938	21,578	10,979	5,368	16,347
2027	32,886	4,885	37,771	18,166	13,552	31,717
2028	38,731	5,781	44,512	21,361	16,409	37,771
2029	39,588	5,903	45,491	21,830	17,093	38,923
2030	40,637	6,028	46,666	22,402	17,736	40,138
2031	41,610	6,128	47,738	22,928	18,457	41,385
2032	42,724	6,246	48,970	23,586	19,164	42,751
2033	43,629	6,332	49,961	24,079	19,819	43,899
2034	44,675	6,437	51,112	24,650	20,570	45,221
2035	45,748	6,543	52,291	25,236	21,300	46,536
2036	46,975	6,670	53,645	25,907	22,199	48,106
2037	47,973	6,761	54,734	26,453	22,876	49,329
2038	49,127	6,873	56,000	27,085	23,761	50,846
2039	50,310	6,987	57,297	27,732	24,607	52,339
2040	51,663	7,122	58,785	28,473	25,594	54,068
2041	51,995	7,211	59,206	28,657	26,422	55,079
2042	52,473	7,321	59,795	28,920	27,308	56,228
2043	52,956	7,433	60,389	29,185	28,289	57,474
2044	53,590	7,567	61,157	29,533	29,458	58,991
2045	53,935	7,662	61,597	29,723	30,403	60,126
2046	54,432	7,779	62,211	29,996	31,484	61,479
2047	54,933	7,898	62,831	30,271	32,593	62,864
2048	55,591	8,041	63,632	30,632	33,868	64,500
2049	55,951	8,142	64,092	30,829	34,943	65,772
2050	56,466	8,267	64,733	31,174	36,279	67,453

Figure 5-1 illustrates forecasted T&R from 2021 through 2050. In 2022, revenue is expected to increase by 4.3 percent as traffic volumes continue to recover from the impact of the pandemic. Between 2022 and 2027, average annual revenue growth is forecasted at 3.2 percent. Growth will be boosted by the completion of the I-490 Tollway in 2026, as well as by the completion of the I-294 reconstruction and widening project in phases between 2022 and 2027. Beyond 2027, expected revenue is forecasted to grow at an average annual rate of 1.9 percent.

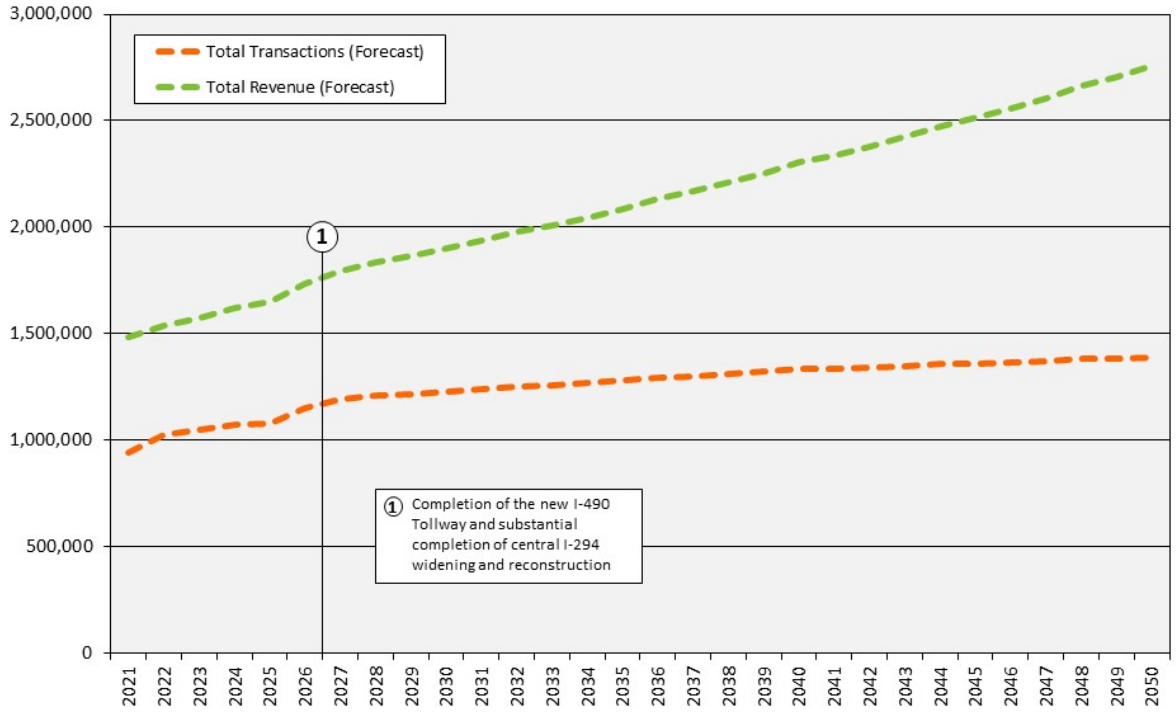


Figure 5-1. Chart of Systemwide Transactions and Revenue, 2021–2050

The share of revenue collected from CVs is forecast to increase over time because of the annual inflation-based toll rate adjustments. CV revenues are expected to consistently exceed PC revenues by 2023. The previous 2005 CV rate increase, 2012 PC rate increase, and 2015 through 2017 CV rate increases demonstrate that Illinois Tollway users have a relatively low sensitivity to toll rate increases. The year-over-year declines in transactions following these toll rate increases, if any, were minor and short-lived. One potential risk to the CV revenue forecast is if annual rate adjustments fall significantly below the assumed annual rate increase of 2.0 percent beyond 2021.

5.7 Disclaimer

CDM Smith used currently-accepted professional practices and procedures in the development of the traffic and revenue estimates in this report. However, as with any forecast, it should be understood that differences between forecasted and actual results may occur, as caused by events and circumstances beyond the control of the forecasters. In formulating the estimates, CDM Smith reasonably relied upon the accuracy and completeness of information provided (both written and oral) by the Illinois Tollway. CDM Smith also relied upon the reasonable assurances of independent parties and is not aware of any material facts that would make such information misleading.

CDM Smith made qualitative judgments related to several key variables in the development and analysis of the traffic and revenue estimates that must be considered as a whole; therefore, selecting portions of any individual result without consideration of the intent of the whole may

create a misleading or incomplete view of the results and the underlying methodologies used to obtain the results.

CDM Smith gives no opinion as to the value or merit of partial information extracted from this report.

All estimates and projections reported herein are based on CDM Smith's experience and judgment and on a review of information obtained from multiple agencies, including the Illinois Tollway. These estimates and projections may not be indicative of actual or future values, and are therefore subject to substantial uncertainty. Certain variables such as future developments, economic cycles, pandemics, government actions, climate change-related events, or impacts related to advances in automotive technology etc. cannot be predicted with certainty and may affect the estimates or projections expressed in this report, such that CDM Smith does not specifically guarantee or warrant any estimate or projection contained within this report.

While CDM Smith believes that the projections and other forward-looking statements contained within the report are based on reasonable assumptions as of the date of the report, such forward-looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following the date of this report, CDM Smith will take no responsibility or assume any obligation to advise of changes that may affect its assumptions contained within the report as they pertain to socioeconomic and demographic forecasts, proposed residential or commercial land use development projects, and/or potential improvements to the regional transportation network.

The report and its contents are intended solely for use by the Illinois Tollway and designated parties approved by the Illinois Tollway and CDM Smith. Any use by third parties, other than as noted above, is expressly prohibited. In addition, any publication of the report without the express written consent of CDM Smith is prohibited.

CDM Smith is not, and has not been, a municipal advisor as defined in federal law (the Dodd Frank Bill) to the Illinois Tollway and does not owe a fiduciary duty pursuant to Section 15B of the Exchange Act to the Illinois Tollway with respect to the information and material contained in this report. CDM Smith is not recommending and has not recommended any action to the Illinois Tollway. The Illinois Tollway should discuss the information and material contained in this report with any and all internal and external advisors that it deems appropriate before acting on this information.

Chapter 6
Sensitivity Tests

A total of five sensitivity tests were conducted to measure the impact on annual T&R due to large changes in model parameters. In this test, VOCs include the same items as described in Section 4.2.6. These tests are meant to represent relatively extreme cases, which are not expected to occur in practice but illustrate the resilience of the Illinois Tollway's traffic and revenue forecasts to potential future shocks. Each sensitivity test was conducted in the future model years of 2030, 2040, and 2050 using the same assumptions for future-year highway networks as described in Chapter 5. The sensitivity tests include the following:

- **VOT:** Increase or decrease VOT assumption in the model by 20 percent.
- **VOC:** Increase VOCs (e.g., cost of gasoline) by 50 percent.
- **CV toll rates:** Reduce annual growth rate assumption for CV toll rate from 2.0 percent to 1.0 percent.
- **Socioeconomic growth:** Eliminate growth in total travel demand between model years.
- **Telecommuting:** Substantially increase work-from-home assumption for industry classifications with high propensity to telecommute.

The following sub-sections describe each sensitivity test in greater detail, along with the results of each test.

6.1 Higher Value of Time

VOT is a critical parameter in the toll diversion model. A motorist's decision to use a toll road is heavily influenced by the travel time savings relative to the toll charged. By increasing VOT, drivers will have a greater incentive to travel the fastest route. In turn, the T&R on the Illinois Tollway should increase. Decreasing VOT, which could be the result of declining wages in a generally weaker economy, should have the opposite effect. Figure 6-1 shows the impact of 20-percent higher VOTs for all vehicle rate tiers, and Figure 6-2 shows the impact of 20-percent lower VOTs.

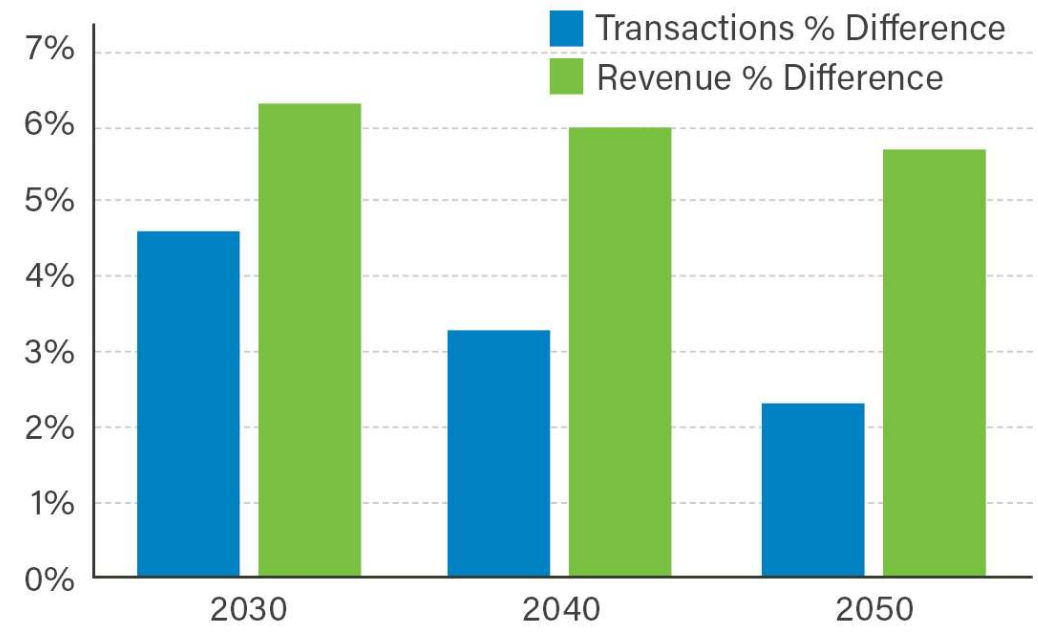


Figure 6-1. Results of Higher Value of Time Sensitivity Test

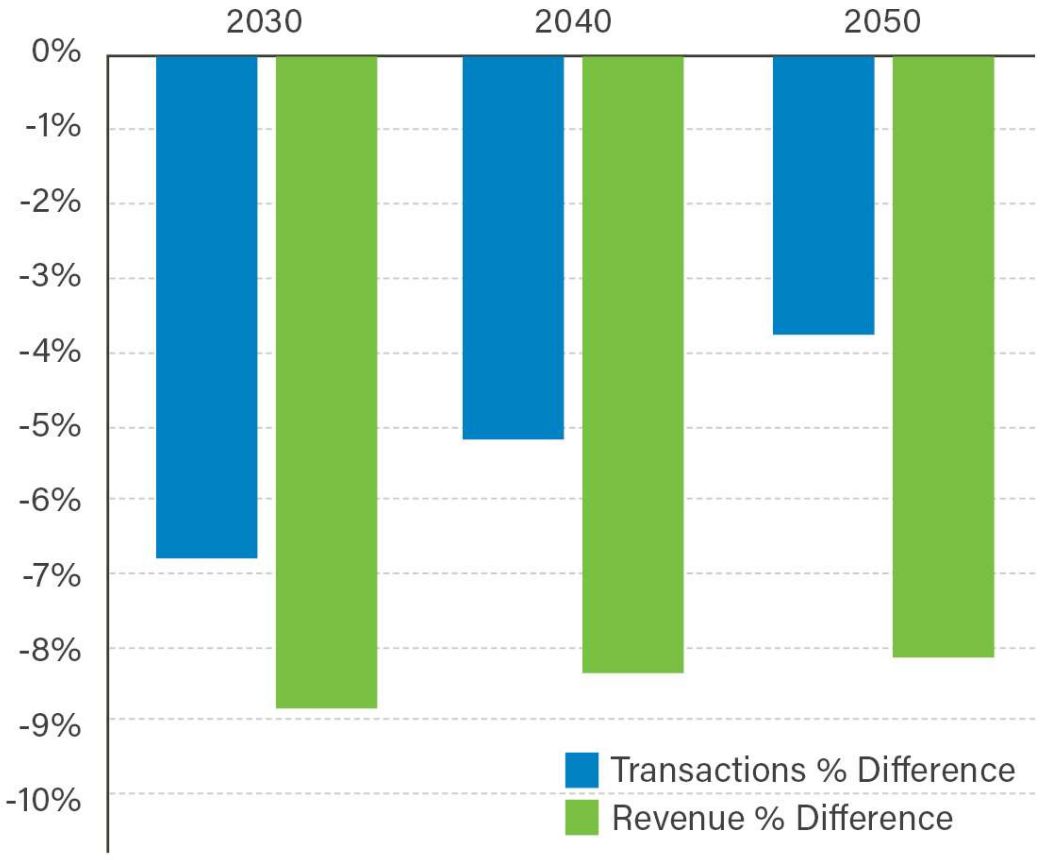


Figure 6-2. Results of Lower Value of Time Sensitivity Test

The results show that for a 20-percent VOT increase, systemwide revenue increases approximately 6.3 percent in 2030 and 5.7 percent in 2050. When VOT is decreased 20 percent, systemwide revenue decreases 8.8 percent in 2030 and 8.1 percent in 2050. The IL 390 and I-490 facilities, which have higher per-mile toll rates, experience the largest impacts on traffic volumes in the VOT sensitivity tests.

The impact of changes in VOT differs between PC and CV T&R, with CVs more sensitive to changes in VOT than PCs. The constant PC toll rate through 2050 decreases over time to save one minute, in real terms. As a result, PC travelers become less sensitive to the change in VOT. In contrast, CV toll rates, which rise annually with inflation, make CVs consistently sensitive to the change in VOT over time.

6.2 Vehicle Operating Costs

For the VOC test, CDM Smith increased the VOC for all vehicle classes by 50 percent in all years. VOCs are based on the distance traveled, not the time traveled, and so motorists' sensitivity to trip distance increases in this test. As a result, the shortest distance path becomes more important relative to time savings, making the Tollway system relatively less attractive for more trips compared to arterial routes. At the same time, rising gas prices also reduce overall travel demand as individuals carpool, make use of transit options, walk, bike, or forgo trips entirely.

In addition to increasing the fuel component of VOC by 50 percent, CDM Smith reduced regional travel demand by 15.0 percent in all years. This assumption tests a more extreme case for the purposes of the sensitivity test; for reference, the Great Recession of 2007–2009 resulted in an estimated 4.0-percent reduction in systemwide transactions, including a 1.1-percent decrease in PC transactions and a 16.0-percent decrease in CV transactions.

Figure 6-3 illustrates the T&R impacts of increased motor fuel costs. Reduction in revenue is substantial at approximately 16.5 percent in 2030 and 15.5 percent in 2050. This effect diminished slightly over time as regional demand and congestion increases, which makes local roads less attractive. However, the majority of the impact on T&R in this test is the result of lower regional travel demand overall, rather than VOCs alone.

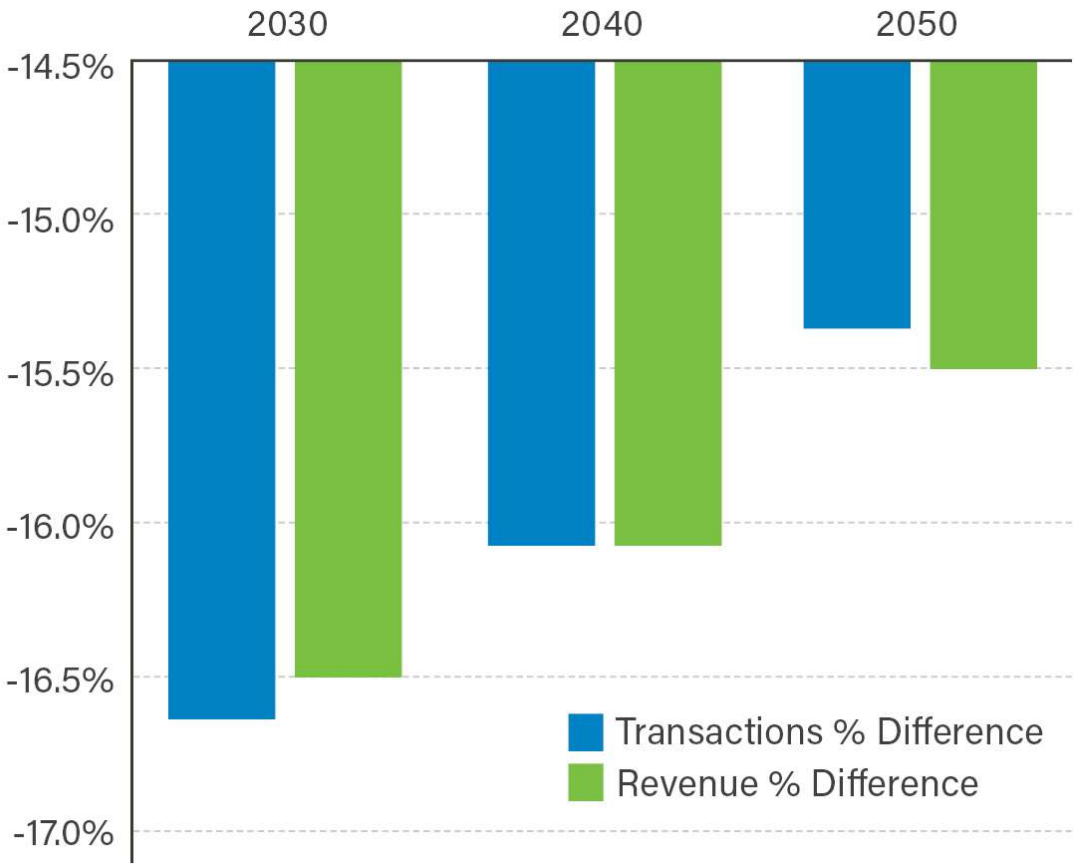


Figure 6-3. Results of Higher Vehicle Operating Costs Sensitivity Test

6.3 Commercial Vehicle Toll Rates

CVs represent a core component of the Illinois Tollway's revenue base, and the importance of CV traffic has grown in recent years. This trend is expected to continue, given that current Illinois Tollway policy indexes CV toll rates to the CPI over time while no PC toll rate increases are scheduled. CDM Smith currently assumes that CV toll rates will increase 2.0 percent annually beginning 2023, which is in line with historical trends over the past 20 to 30 years, as well as the inflation target typically adopted by the Federal Reserve System. If actual inflation is lower than that level for an extended period of time, the Tollway could face a potentially substantial revenue risk.

This sensitivity test replaces the 2.0-percent annual CPI increase with a lower assumption of 1.0-percent annual increase, beginning in year 2023. Over time, this results in a substantially lower average CV toll rate. Overall, the Tollway attracted more CV trips in this test, but the higher volumes are not sufficient to offset the reduction in revenue from the lower toll rate, with the variance increasing over time. In addition, there are fewer PC trips on the Tollway in this sensitivity test because of the increased congestion caused by the higher volume of CV trips. As shown in Figure 6-4, revenues decline by 1.9 percent in 2030 and 4.7 percent in 2050. Impacts of the sensitivity test were largest on the IL 390 and I-490 facilities, which have the highest per-mile

toll rates on the Tollway system; a lower rate of growth in CV toll rates results in higher traffic volumes on these facilities in the sensitivity test.

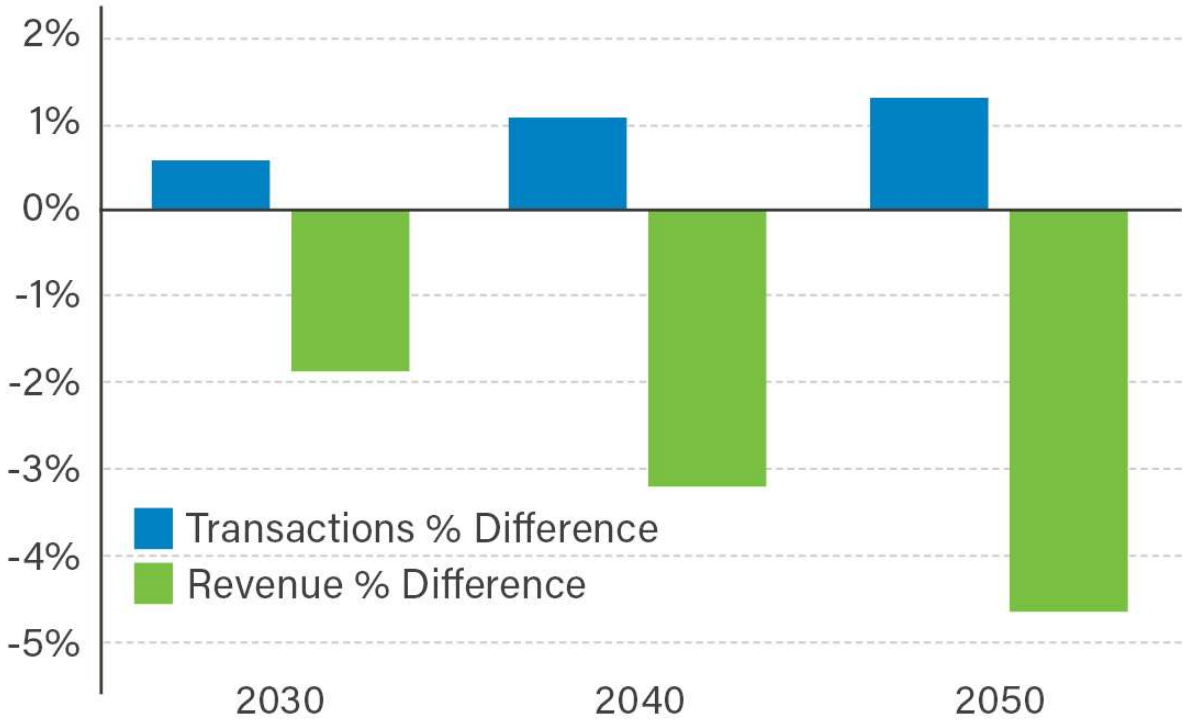


Figure 6-4. Results of Commercial Vehicle Toll Rate Increase Sensitivity Test

6.4 Socioeconomic Growth

This sensitivity test considers the impacts of no trip growth in the modeling region. Specifically, the total number of trips in 2020 is held as a controlled total in future years 2030, 2040, and 2050, but land use changes in the underlying socioeconomic forecast are allowed to continue. As a result, origin–destination patterns change over the model years. Changes in land use, combined with changes in the other modeling parameters (e.g., capacity additions to the highway network, an increase in CV toll rates over time) result in changes to T&R in this sensitivity test.

As demonstrated in Figure 6-5, there is a substantial reduction in Tollway T&R in this test, growing from a 2.7-percent reduction in 2030 to an 11.2-percent reduction in 2050. Much of this reduction reflects the direct loss of trips due to an overall decline in travel demand. In addition, there is less congestion across the regional highway network in this sensitivity test, which, in turn, makes the Tollway system a less-attractive option compared to untolled alternative routes. The rerouting of trips in favor of untolled alternatives further reduces T&R on the Tollway system.

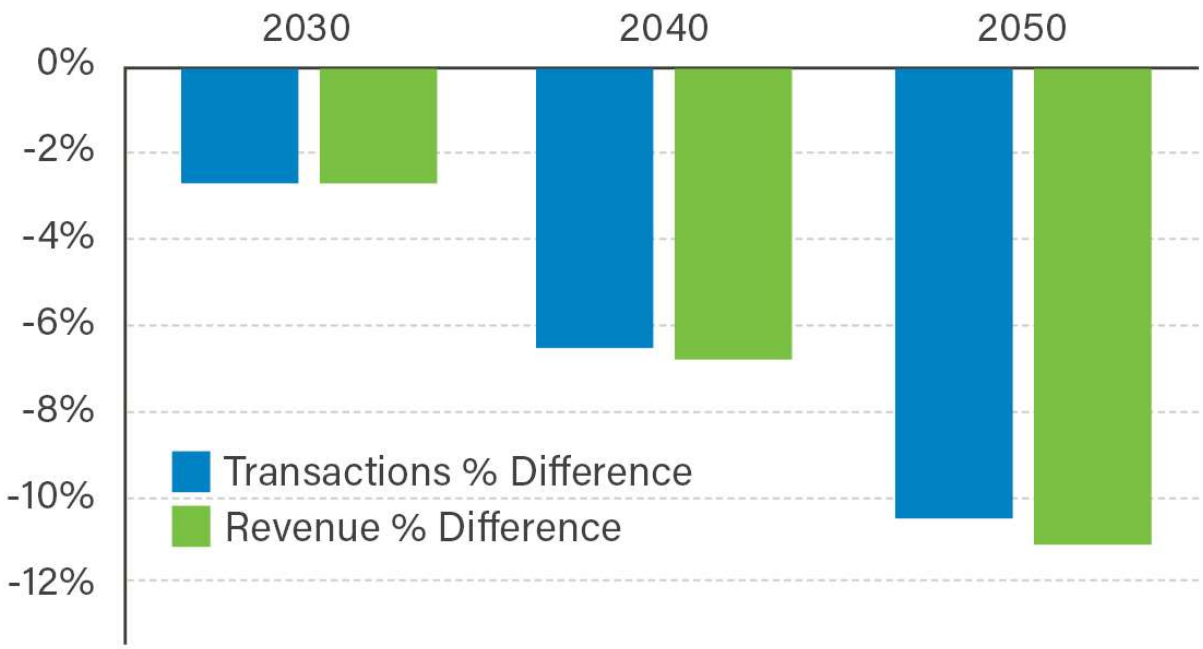


Figure 6-5. Results of No Trip Growth Sensitivity Test

6.5 Telecommuting

Throughout the COVID-19 pandemic, many jobs have been performed remotely due to social distancing measures. During the peak of social distancing measures in the late spring of 2020, nearly 50 percent of employees were working from home, a substantial increase from levels prior to the pandemic. Recent surveys have indicated that people working from home, either full time or part time, will continue permanently, though not as many as during the height of the pandemic.

Given that a substantial share of the Tollway's customer base is commuter PC traffic, a long-term shift in telecommuting behavior could pose a revenue risk. To understand the risk, this telecommuting sensitivity test was conducted in three steps. The first step estimated the propensity of working from home for each employment type classified by the North American Industry Classification System. For example, CDM Smith estimates that jobs in the finance and insurance industry are estimated to have a relatively high propensity to telecommute, while jobs in the utilities or construction industries are estimated to have a relatively low propensity to telecommute. The second step estimated the share of residents in each traffic analysis zone that fall into each employment type. A weighted average percent of working from home was then calculated to represent the aggregate share of telecommuting in that zone. The third step applied the zone-level telecommuting share on home-based work trips. The result is an 11-percent reduction in home-based work trips, which leads to a 3-percent reduction in all trips.

The long-term impact of telecommuting on T&R is illustrated in Figure 6-6. An increase in telecommuting results in 2.3 percent less revenue in 2030 and 1.5 percent less revenue in 2050. Impacts across facilities are relatively consistent in this sensitivity test.

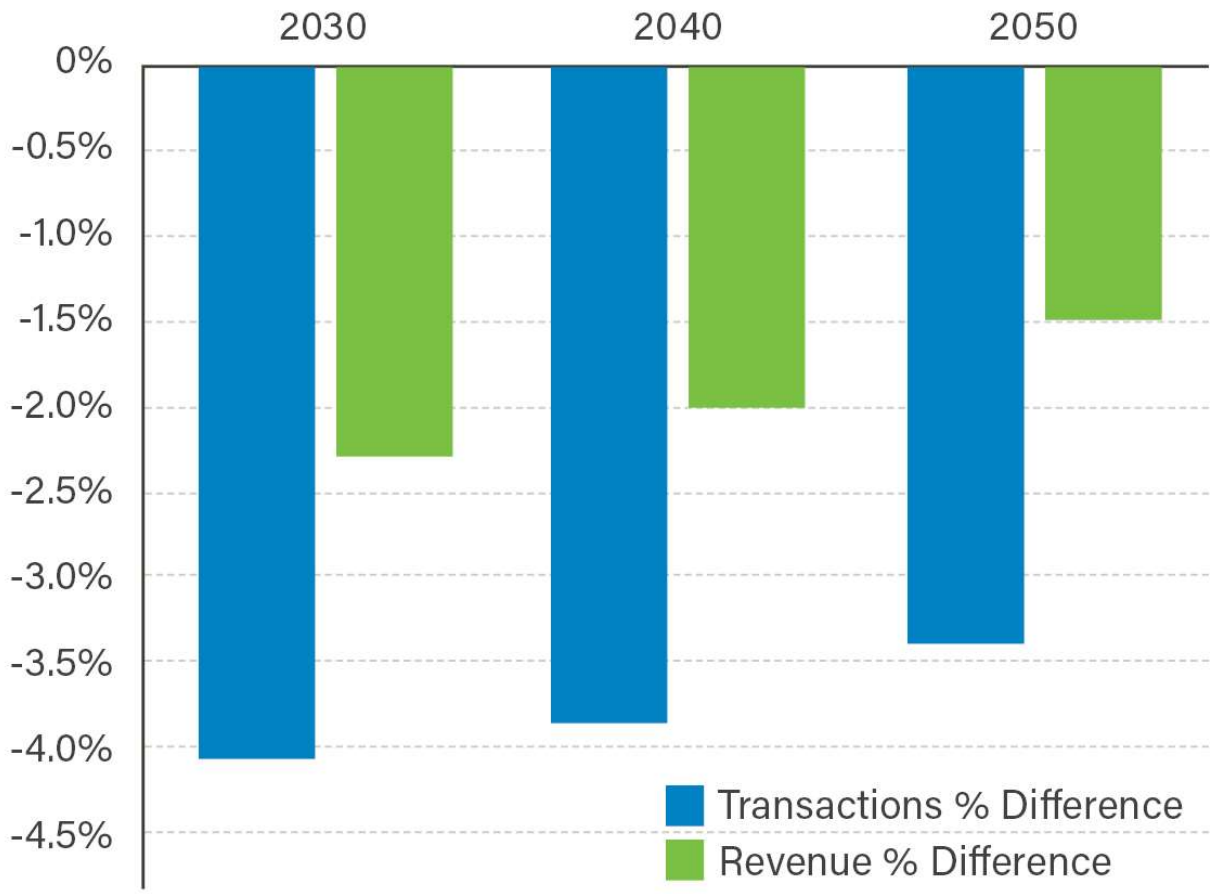


Figure 6-6. Results of Increased Telecommuting Sensitivity Test

This page intentionally left blank.

Appendix A

Toll Rates by Vehicle Classification as of January 1, 2021

As illustrated in the full toll rate table below, mainline and ramp plaza toll rates vary substantially. The toll rates at plazas vary for the following two reasons:

- Plaza toll rates are set to a target per-mile toll rate. Therefore, toll rates at an individual plaza may vary depending on the number of miles of roadway for which the plaza collects tolls.
- Some sections of the Tollway, including all of the Veterans Memorial Tollway, have higher per-mile toll rates.

This page intentionally left blank.

Table A-1. Toll Rates by Plaza for 2021

Toll Plaza	Plaza Number	Passenger Car		CV Daytime (6 a.m.–10 p.m.)			CV Overnight (10 p.m.–6 a.m.)		
		I-PASS	Pay Online	Small	Medium	Large	Small	Medium	Large
Jane Addams Memorial Tollway, Interstate 90									
South Beloit Mainline	1	$0.95	$1.90	$3.30	$4.90	$8.65	$2.15	$3.80	$6.50
East Riverside Boulevard[a]	2	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Genoa Road Eastbound Exit[a]	3	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Genoa Road Westbound Exit[a]	3	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Illinois 173[a]	4	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Irene Road (I-PASS or Pay Online)[b]	5A	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Belvidere Mainline	5	$1.50	$3.00	$5.20	$7.75	$13.80	$3.45	$6.05	$10.35
Illinois 47 (I-90); Eastbound Exit & Westbound Entrance (I-PASS or Pay Online)[b]	6	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Illinois 47 (I-90); Eastbound Entrance & Westbound Exit (I-PASS or Pay Online)[b]	6	$0.30	$0.60	$1.05	$1.45	$2.60	$0.70	$1.20	$2.00
Illinois 23 (I-PASS or Pay Online)[b]	7A	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Marengo Mainline	7	$1.50	$3.00	$5.20	$7.75	$13.80	$3.45	$6.05	$10.35
Randall Road[a]	8	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Elgin Mainline	9	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Barrington Road Eastbound Entrance & Westbound Exit[a]	10	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Barrington Rd Eastbound Exit & Westbound Entrance (I-PASS or Pay Online)[b]	10	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Illinois Route 31[a]	11	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Roselle Road Eastbound Entrance & Westbound Exit[a]	12	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Roselle Road Eastbound Exit & Westbound Entrance (I-PASS or Pay Online)[b]	12	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Meacham Road (I-PASS or Pay Online)[b]	12A	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Illinois Route 25[a]	13	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Illinois Route 59 Westbound Exit[a]	16A	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Illinois Route 59 Eastbound Exit[a]	14	$0.30	$0.60	$1.05	$1.45	$2.60	$0.70	$1.20	$2.00
I-290, Illinois Route 53[a]	15	$0.30	$0.60	$1.05	$1.45	$2.60	$0.70	$1.20	$2.00
Beverly Road[a]	16B	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30

Toll Plaza	Plaza Number	Passenger Car		CV Daytime (6 a.m.–10 p.m.)			CV Overnight (10 p.m.–6 a.m.)		
		I-PASS	Pay Online	Small	Medium	Large	Small	Medium	Large
Devon Mainline	17	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Arlington Heights Road[a]	18	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Elmhurst Road Eastbound Exit, Westbound Entrance (I-PASS or Pay Online)[b]	18A	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
River Road Mainline	19	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Tri-State Tollway, Interstates 294/94/80									
Buckley Road (Illinois 137)[a]	20	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Waukegan Mainline	21	$1.40	$2.80	$4.90	$7.35	$12.95	$3.30	$5.70	$9.75
Townline Road (Illinois 60)[a]	22	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Half Day Road (Illinois 22)[a]	23	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Edens Spur Mainline	24	$0.95	$1.90	$3.30	$4.90	$8.65	$2.15	$3.80	$6.50
Lake Cook Road[a]	26	$0.95	$1.90	$3.30	$4.90	$8.65	$2.15	$3.80	$6.50
Willow Road[a]	27	$0.95	$1.90	$3.30	$4.90	$8.65	$2.15	$3.80	$6.50
Golf Road (Illinois 58)[a]	28	$0.95	$1.90	$3.30	$4.90	$8.65	$2.15	$3.80	$6.50
Touhy Avenue Mainline	29	$0.95	$1.90	$3.30	$4.90	$8.65	$2.15	$3.80	$6.50
Balmoral Northbound (I-PASS or Pay Online)[b]	30	$0.80	$1.60	$3.30	$4.90	$8.65	$2.15	$3.80	$6.50
O'Hare West[a]	31	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
O'Hare East[a]	32	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Irving Park Road (Illinois 19) Mainline	33	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
75th Street, Willow Springs Road[a]	34	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Cermak Road (22nd Street) Mainline	35	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
82nd Street Mainline	36	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
I-55 (Stevenson Expressway)[a]	37	$0.30	$0.60	$1.05	$1.45	$2.60	$0.70	$1.20	$2.00
U.S. 12-20, 95th Street[a]	38	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
83rd Street Mainline	39	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
U.S. 6, 159th Street[a]	40	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
163rd Street Mainline	41	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
I-57 / 147th Street (Illinois 83) (I-PASS or Pay Online)[b]	42	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
I-80 Westbound	43	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90

Toll Plaza	Plaza Number	Passenger Car		CV Daytime (6 a.m.–10 p.m.)			CV Overnight (10 p.m.–6 a.m.)		
		I-PASS	Pay Online	Small	Medium	Large	Small	Medium	Large
I-80 Eastbound	45	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Halsted Street (Illinois 1)[a]	47	$0.30	$0.60	$1.05	$1.45	$2.60	$0.70	$1.20	$2.00
Reagan Memorial Tollway, Interstate 88									
York Mainline	51	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Meyers Mainline	52	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Spring Rd (22nd Street)[a]	53	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Illinois 83[a]	54	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Midwest Road[a]	55	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Highland Avenue[a]	56	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Naperville Road[a]	57	$0.30	$0.60	$1.05	$1.45	$2.60	$0.70	$1.20	$2.00
Winfield Road[a]	58	$0.30	$0.60	$1.05	$1.45	$2.60	$0.70	$1.20	$2.00
Farnsworth Avenue[a]	59	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Eola Road (I-PASS or Pay Online)[a]	60	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Aurora Mainline	61	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Illinois 31[a]	63	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Orchard Road[a]	64	$0.45	$0.90	$1.60	$2.50	$4.30	$1.15	$2.00	$3.30
Illinois 47 (I-88) (I-PASS or Pay Online)[b]	64A	$0.55	$1.10	$2.00	$2.90	$5.20	$1.30	$2.30	$3.90
Peace Road[a]	65	$0.75	$1.50	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
DeKalb Mainline	66	$1.80	$3.60	$6.20	$9.25	$16.40	$4.15	$7.25	$12.35
Annie Glidden Road[a]	67	$1.05	$2.10	$3.60	$5.35	$9.50	$2.45	$4.20	$7.20
Dixon Mainline	69	$1.80	$3.60	$6.20	$9.25	$16.40	$4.15	$7.25	$12.35
Veterans Memorial Tollway, Interstate 355									
Army Trail Road Mainline	73	$0.95	$1.90	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
North Avenue (Illinois 64)[a]	75	$0.75	$1.50	$2.05	$3.15	$5.50	$1.40	$2.45	$4.15
Roosevelt Road (Illinois 38)[a]	77	$0.65	$1.30	$1.85	$2.75	$4.85	$1.20	$2.15	$3.60
Butterfield Road (Illinois 56)[a]	79	$0.45	$0.90	$1.30	$2.00	$3.45	$0.85	$1.55	$2.60
Ogden Avenue (U.S. 34)[a]	81	$0.45	$0.90	$1.30	$2.00	$3.45	$0.85	$1.55	$2.60
Maple Avenue[a]	83	$0.55	$1.10	$1.55	$2.30	$4.15	$1.05	$1.85	$3.15
63rd Street[a]	85	$0.65	$1.30	$1.85	$2.75	$4.85	$1.20	$2.15	$3.60
75th Street[a]	87	$0.75	$1.50	$2.05	$3.15	$5.50	$1.40	$2.45	$4.15

Toll Plaza	Plaza Number	Passenger Car		CV Daytime (6 a.m.–10 p.m.)			CV Overnight (10 p.m.–6 a.m.)		
		I-PASS	Pay Online	Small	Medium	Large	Small	Medium	Large
Boughton Road Mainline	89	$0.95	$1.90	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Boughton Road[a]	90	$0.45	$0.90	$1.30	$2.00	$3.45	$0.85	$1.55	$2.60
127th Street[a]	93	$0.95	$1.90	$2.60	$3.90	$6.90	$1.75	$3.00	$5.20
Archer Avenue/143rd Street[a]	95	$1.20	$2.40	$3.35	$5.20	$8.95	$2.25	$4.00	$6.75
Illinois 7 (159th Street)[a]	97	$1.40	$2.80	$3.90	$5.95	$10.35	$2.60	$4.65	$7.75
Spring Creek Mainline	99	$1.90	$3.80	$5.20	$7.75	$13.80	$3.45	$6.05	$10.35
U.S. 6[a]	101	$0.45	$0.90	$1.30	$2.00	$3.45	$0.85	$1.55	$2.60

Illinois Route 390 Tollway–All Electronic Toll Roads (I-PASS or Pay Online)															
		Passenger Car		CV Daytime (6 a.m.–10 p.m.)						CV Overnight					
				Small		Medium		Large		Small		Medium		Large	
Toll Plaza	Plaza Number	I-PASS	Pay Online	I-PASS	Pay Online	I-PASS	Pay Online	I-PASS	Pay Online	I-PASS	Pay Online	I-PASS	Pay Online	I-PASS	Pay Online
Lively Boulevard Mainline[b]	320	$0.20	$0.40	$0.45	$0.65	$0.65	$0.95	$1.15	$1.75	$0.25	$0.45	$0.50	$0.75	$0.80	$1.25
Mittel Drive Mainline[b]	322	$0.20	$0.40	$0.45	$0.65	$0.65	$0.95	$1.15	$1.75	$0.25	$0.45	$0.50	$0.75	$0.80	$1.25
Hamilton Lakes Drive Mainline[b]	324	$0.25	$0.50	$0.55	$0.80	$0.80	$1.25	$1.45	$2.20	$0.40	$0.60	$0.65	$0.95	$1.10	$1.60
Ketter Drive[b]	325	$0.20	$0.40	$0.45	$0.65	$0.65	$0.95	$1.15	$1.75	$0.25	$0.45	$0.50	$0.75	$0.80	$1.25
Plum Grove Road Mainline[b]	326	$0.60	$1.20	$1.25	$1.90	$1.90	$2.85	$3.35	$5.00	$0.80	$1.30	$1.45	$2.20	$2.50	$3.70
Mitchell Boulevard Mainline[b]	328	$0.35	$0.70	$0.80	$1.25	$1.20	$1.80	$2.10	$3.20	$0.55	$0.80	$0.90	$1.40	$1.55	$2.40
Lake Street Mainline[b]	330	$0.30	$0.60	$0.65	$0.95	$1.05	$1.55	$1.80	$2.70	$0.45	$0.65	$0.75	$1.15	$1.35	$2.05

Notes

[a] Unattended ramp plazas. I-PASS, E-ZPass or exact amount only.

[b] Cashless Tolling: No cash baskets or toll booths at this location. Cash is not accepted. Drivers should use an I-PASS, E-ZPass, or pay tolls online within 14 days.

Vehicle Category	Description
Passenger Car	2 axles – four or fewer tires; auto, SUV, motorcycle, taxi
Small CV	2 axles – six tires; single-unit truck, buses
Medium CV	3- and 4-axle vehicle or passenger vehicles with 1- or 2-axle side-car or trailer
Large CV	5+-axle vehicle or passenger vehicles with 3+-axle trailer

Appendix B

Socioeconomic Trends & Forecast

This page intentionally left blank.

Development and Validation of a Policy-Neutral Socioeconomic Forecast
for the Illinois Tollway Service Area

Kermit W. Wies, Ph.D.
Senior Research Fellow and Adjunct Professor
Northwestern University Transportation Center
April 9, 2020

Table of Contents

Table of Figures

1 Executive Summary

This report documents the development of a socioeconomic forecast for the Illinois Tollway service area. It includes an accompanying dataset that quantifies future population and employment values at the fine-grained geography required for analyzing travel demand and transportation network performance.

This socioeconomic forecast represents a "Policy-Neutral" counterpart to that prepared by Chicago Metropolitan Agency Planning (CMAP). The CMAP forecast represents the projected population and employment outcome of ON TO 2050, the region's long-range comprehensive plan; a policy document that calls for significant public intervention to alter future land development trends in the region[1]. ON TO 2050 is the region's official long-range transportation plan (LRTP) and CMAP's socioeconomic data is the "forecast of record" used for evaluating federally-funded transportation improvements.

In contrast, the Policy-Neutral forecast is "built-up" from currently observed land use patterns. The difference between land-use assumptions underlying the CMAP ON TO 2050 socioeconomic forecast and the Policy-Neutral forecast results in the latter being more conservative with respect to overall growth. See Figure 1. In this report, both the CMAP and the Policy-Neutral forecast are validated against county-level econometric projections from independent analyses.

21-county modeling region[2]	Year 2015	Year 2050 Policy-Neutral forecast	Year 2050 CMAP forecast
Population	10,312,287	11,704,553	13,463,945
Employment	4,837,553	5,720,856	5,870,691

Figure 1: Comparison of Policy-Neutral with CMAP forecasts

Because the Policy-Neutral forecast was prepared using empirically validated data sources and verified by visual inspection at the geographic scale used for travel demand modeling, it is this report's conclusion that the Policy-Neutral socioeconomic forecast represents a plausible future socioeconomic forecast for the Illinois Tollway service area and provides a useful comparison to CMAP's forecast.

2 Forecasting geography and data

"Socioeconomic forecast" is a term used in conventional travel demand modeling that refers to the data that defines household and job composition for a specified future year. These data are the primary inputs to the Trip Generation step of a sequential four-step trip-based urban travel demand model. The Policy-Neutral forecast dataset includes household and employment values for years 2020, 2030, 2040 and 2050.

A specific technical objective of this study is to produce population and employment values that are directly comparable with those used by Chicago Metropolitan Agency for Planning (CMAP) in its travel demand model. In this case, the CMAP forecast takes the form of a flat-file database that enumerates

[1] Chicago Metropolitan Agency for Planning, ON TO 2050 Regional Comprehensive Plan, 2018. https://www.cmap.illinois.gov/2050/implementing-the-plan Retrieved 12/21/2019.

[2] Defined by CMAP as all or part of 21 counties, in three states, surrounding Chicago.

population and employment variables by sub-units of geographically-discrete traffic analysis zones (TAZs)[3].

Figure 2 shows county and TAZ boundaries included in the modeling region. The purple shaded area denotes CMAP's official planning area. The CMAP modeling region extends beyond this to ensure that external travel demand is properly captured[4]. A table summarizing the count of zones found within each county appears in Appendix A.

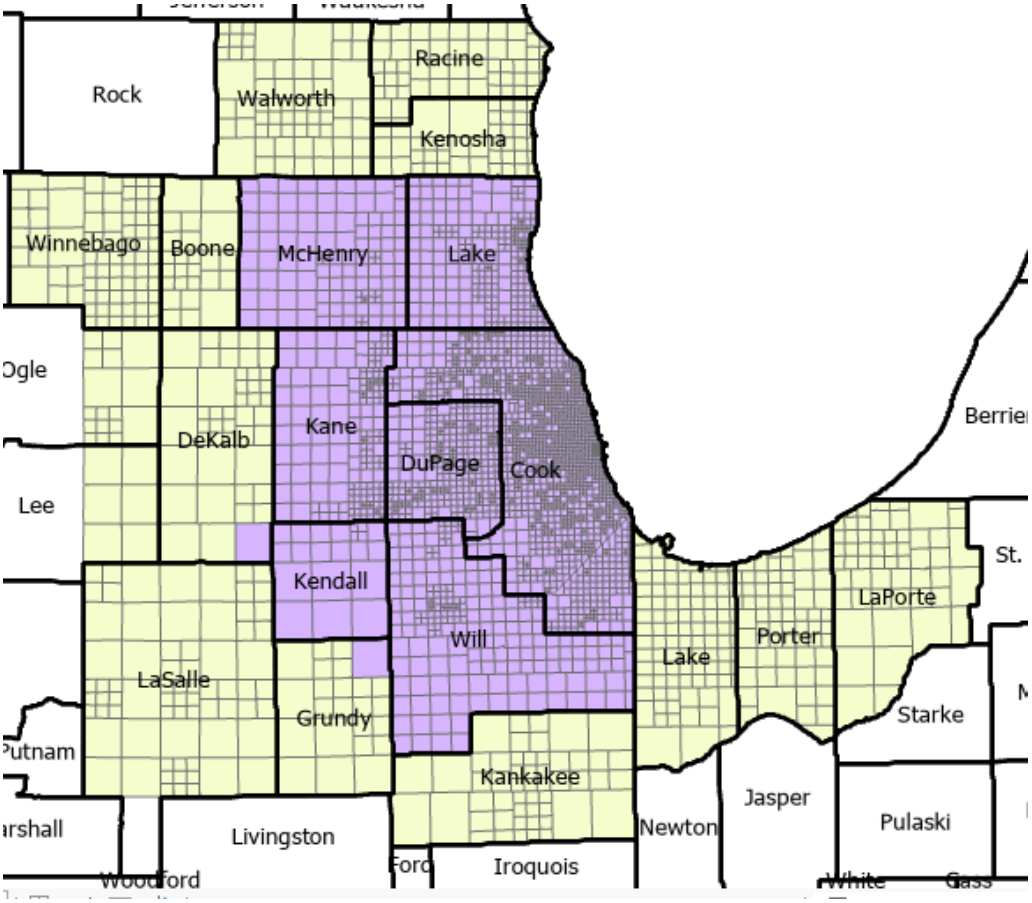


Figure 2: Study area defined by CMAP modeling zones (i.e. TAZs)

2.1 Existing land use data

The primary empirical data resource used to derive the Policy-Neutral forecast within the seven counties surrounding Chicago is CMAP's 2015 Land Use Inventory (LUI)[5]. The LUI is formatted within a Geographic Information System (GIS) in which each parcel of land is digitally mapped with its current use

[3] These sub-units are defined by CMAP and called "subzone17". Subzones uniformly nest within CMAP's current TAZ system, called "zone17".

[4] Note that the CMAP planning area includes three townships within DeKalb and Grundy Counties. All data tabulations appearing in this report include these townships within their respective counties.

[5] Chicago Metropolitan Agency for Planning (CMAP), Land Use Inventory, 2013. https://www.cmap.illinois.gov/data/land-use/inventory. Retrieved 12/22/2019.

characterized according to a standard classification. The GIS format allows land use classifications to be directly overlaid on satellite imagery for close-up visual verification.

2.2 Existing population data

For this study, CMAP provided Year 2015 population that was used as the starting point for the Policy-Neutral forecast. The table below compares 2015[6] Census population estimates with a summation of CMAP's "persons-living-in-households" from its 2015 socioeconomic file. The Census value is an estimate of the full population. The CMAP trip generation model, however, does not use the full population. Like most urban travel demand models, household composition (expressed as "adults-, workers-, children-per-household") is the fundamental unit upon which trip-making is calculated. By Census definition, a household consists of all the persons who occupy a housing unit as their usual place of residence[7]. Average household size is obtained by dividing the total number of persons living in households by the total number of households within a particular census geography. Unlike the fully enumerated population estimate, these data are collected from the American Community Survey (ACS) and thus represent a rolling sample of averages[8]. For these reasons, it is safe to consider the Census' enumeration-based population value an independent source for comparison to CMAP's ACS-derived estimates. The CMAP values in Figure 3 represent the sum of adults- plus children-living-in-households.

2015	Census Population	CMAP Adults + Children	CMAP/Census
CMAP 7 counties	8,532,681	8,388,442	0.98
CMAP Modeling Region	10,568,198	10,312,287	0.98

Figure 3: Population Comparison

As expected, the CMAP value is slightly less than the Census total (due primarily to the omission of persons-in-group-quarters[9]), with this shortfall confirmed when scrutinizing townships with major higher education campuses or military installations (e.g. Great Lakes Naval Training Center in Shields Township, Lake County). CMAP's 2015 county totals are all within 3% of Census. See Figure 4[10].

[6] https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/2010-2017/2017-natstcopr-meth.pdf

[7] People not living in households are classified as living in group quarters (e.g. dormitories, military barracks, group-homes). Trips made by persons in group quarters are calculated separately within the CMAP trip generation model and are not included in this analysis. Incarcerated persons are not included in the CMAP group-quarters variable(s), though they do appear in the full enumeration.

[8] https://www.census.gov/quickfacts/fact/note/US/HSD410217

[9] Only the portions of Lee and Ogle Counties included in the CMAP modeling zone system are included in the CMAP totals for this table. All of Lee and Ogle counties are included in the Census totals. Because these counties are primarily rural in character, the differences in household and job totals are minimal at this scale.

[10] The rural portions of Lee and Ogle Counties included in the CMAP modeling zone system are not included in this chart.

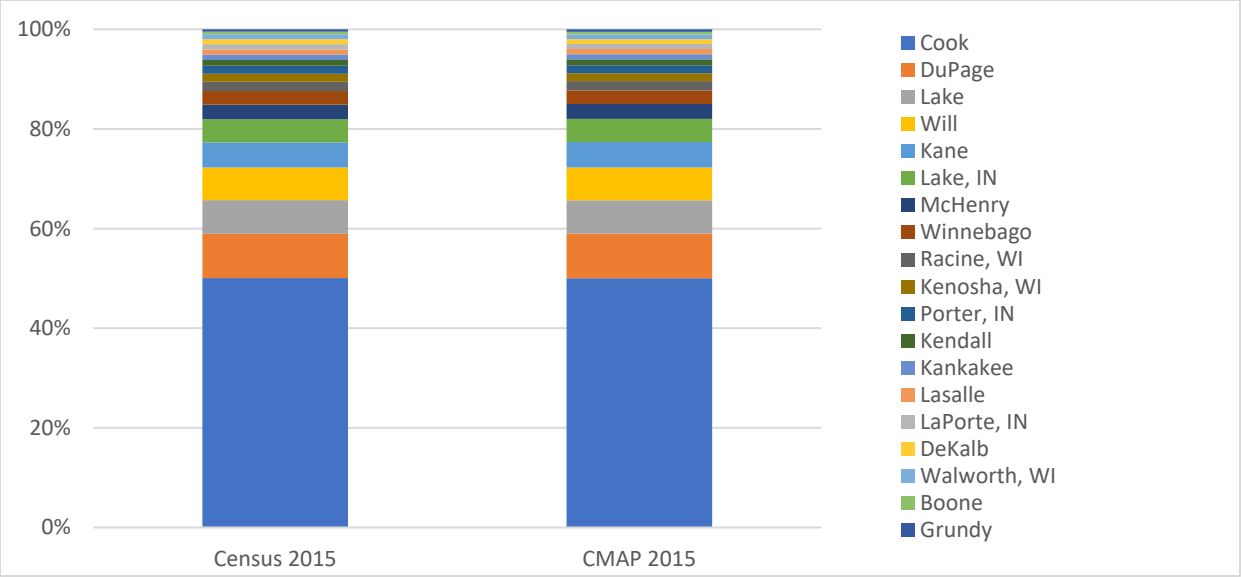


Figure 4: 2015 Population ranked by County comparison

2.3 Existing employment data

Figure 5 compares three independent estimates: County Business Patterns (CBP)[11], Bureau of Labor Statistics (BLS)[12] and Bureau of Economic Analysis (BEA)[13] with CMAP's 2015 "total employment" variable. With respect to employment estimates, there is considerable variation in how a "job" is defined across data sources, leading to a range of employment estimates depending on the source. The Policy-Neutral forecast is reconciled with the BLS estimates because these are most consistent with the number of "employed persons" (i.e. workers) found among the population.

2015	CMAP Total Employment	CBP	CMAP/CBP	BLS	CMAP/BLS	BEA	CMAP/BEA
CMAP 7 counties	4,085,500	3,790,917	1.08	4,016,846	1.02	5,465,761	0.75
CMAP Modeling Region	4,837,553	4,481,160	1.08	4,791,156	1.01	6,488,390	0.75

Figure 5: 2015 Employment Comparison

[11] https://www.census.gov/programs-surveys/cbp/technical-documentation/methodology.html
[12] https://www.bls.gov/cew/
[13] https://www.bea.gov

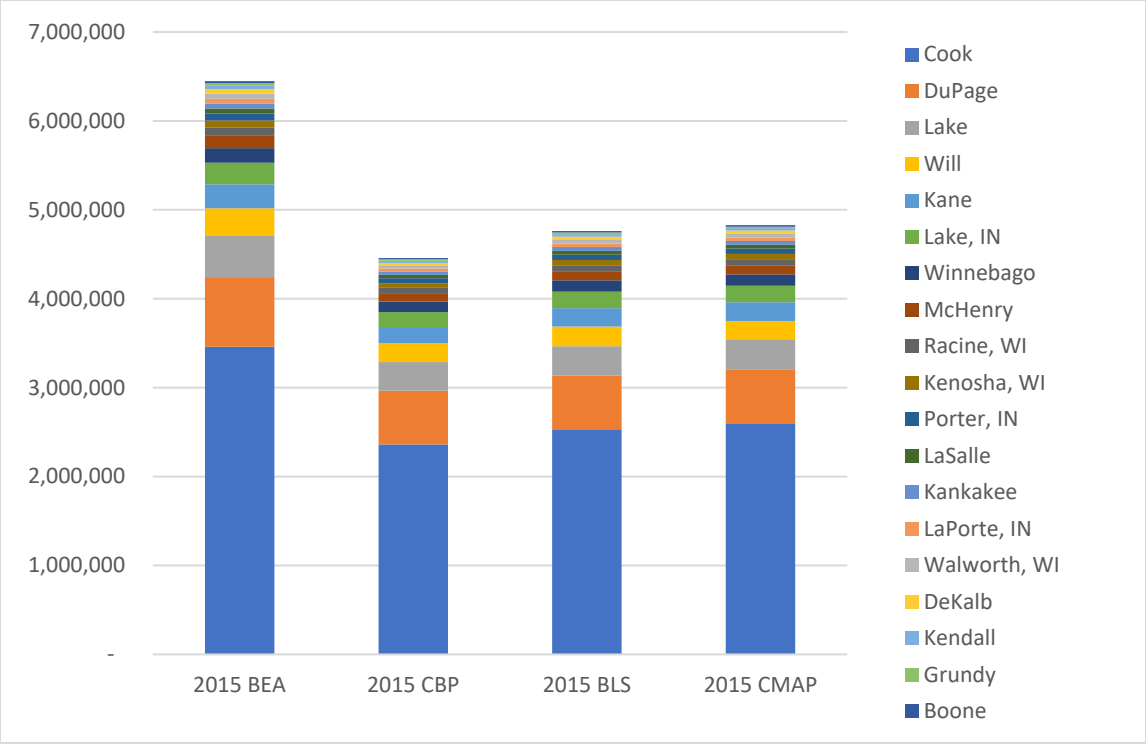


Figure 6: 2015 Employment ranked by County comparison

Figure 6 offers visual confirmation that the relative proportion of jobs within counties is correct. The CBP and BEA differences are consistent with an alternate definition of a "job" used by those sources. In all three cases, however, Cook County consistently holds 53% of the total number of jobs with the remaining county shares not varying by more than 1%.

2.4 Future year benchmarks

Benchmarks are data points from outside sources that offer a comparison to the forecast values being calculated in this study. County-level population and employment projections from three proprietary sources are used to benchmark both the CMAP and Policy-Neutral forecasts. Woods & Poole[14] and Moody's[15] are commercial products that provide population and employment data for a wide variety of business customers. The University of Illinois at Urbana Champaign Regional Economics Applications Laboratory (UIUC/REAL)[16] prepares similar projections for their internal research program as well as for outside clients. The technical process used to develop the CMAP forecast is found in the document "ON TO 2050 Socioeconomic Forecast[17]. The technical process used to develop the Policy-Neutral forecast is found in Section 3: Technical Forecasting Process of this report. Figure 7 and Figure 8 allow a general

[14] Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2019. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of the client.

[15] Moody's Analytics, Economic Data and Forecasts, moodysanalytics.com

[16] University of Illinois at Urbana-Champaign, Regional Economics Application Laboratory, real.illinois.edu. Data source: Appendix_A4_1944TAZs transmitted to client 8/2019.

[17] CMAP, ON TO 2050 Socioeconomic Forecast, 2018. https://datahub.cmap.illinois.gov/dataset/2050-forecast-of-population-households-and-employment. Retrieved, 10/2019

comparison of population and employment totals across the modeling region[18]. Individual county-level comparisons between these sources appear in Appendix E.

2.4.1 Forecast population

Comparing both the CMAP and Policy-Neutral population forecasts to the independently prepared benchmarks across the modeling region, CMAP's ON TO 2050 forecast is the most optimistic. The Policy-Neutral forecast follows the same general growth trajectory as CMAP with a more conservative outcome. The independent econometric forecasts show population growth to be nearly level or in decline, consistent with recent historical trends. See Figure 7.

Population	2020	2030	2040	2050
W&P	10,649,139	10,971,096	11,171,167	11,298,155
Moody's	10,464,057	10,334,264	9,995,175	9,602,735
UIUC	10,804,481	11,319,738	11,803,419	12,193,267
CMAP	10,938,151	11,981,811	12,799,950	13,463,945
Policy Neutral	10,498,577	10,882,676	11,283,853	11,704,553

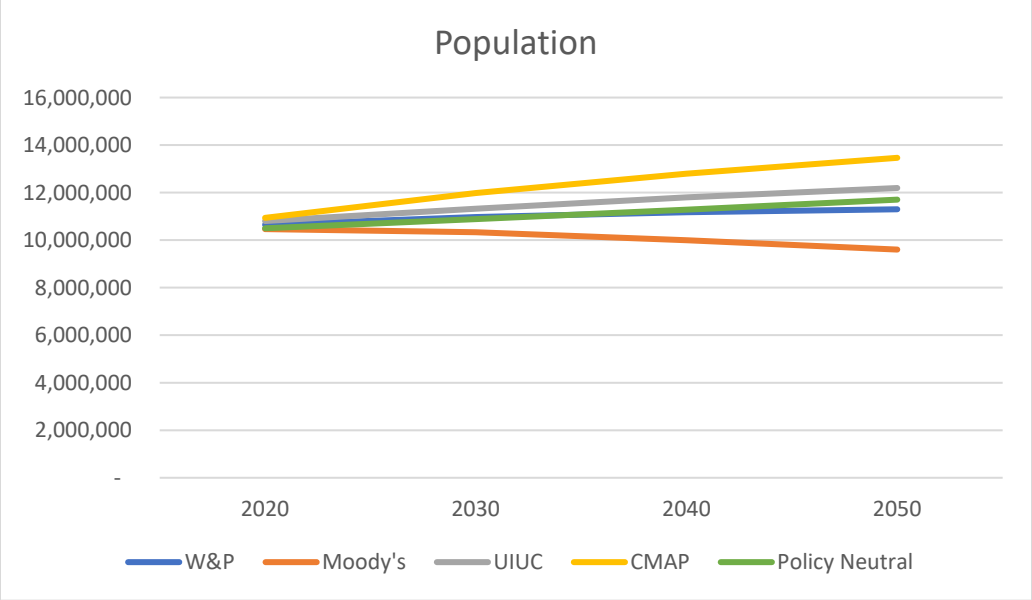


Figure 7: Population forecast comparison with benchmarks, modeling region

[18] Because of minor variations in the variables and geographic extent of each source, these totals are only generally comparable at the regional scale. Specifically, just the portions of Lee, Ogle and LaSalle Counties within the CMAP modeling zone system are included in the CMAP and Policy-Neutral totals. W&P and Moody's benchmark totals cover these counties in their entirety. UIUC does not include forecasts for Racine County, WI or LaPorte County, IN.

2.4.2 Forecast employment

Comparing the employment forecasts with their respective benchmarks, one observes close alignment between all sources. See Figure 8[19]. The difference seen beginning in 2020 is due in part to variation in employment definition. The subsequent convergence is due to a difference in assumed growth rates.

Employment	2020	2030	2040	2050
W&P	6,860,077	7,507,075	8,026,782	8,454,959
Moody's	5,263,333	5,462,616	5,621,798	5,808,372
UIUC	5,180,695	5,503,902	5,777,768	6,121,418
CMAP	5,034,039	5,253,381	5,542,205	5,870,691
Policy Neutral	4,931,973	5,154,438	5,413,435	5,720,856

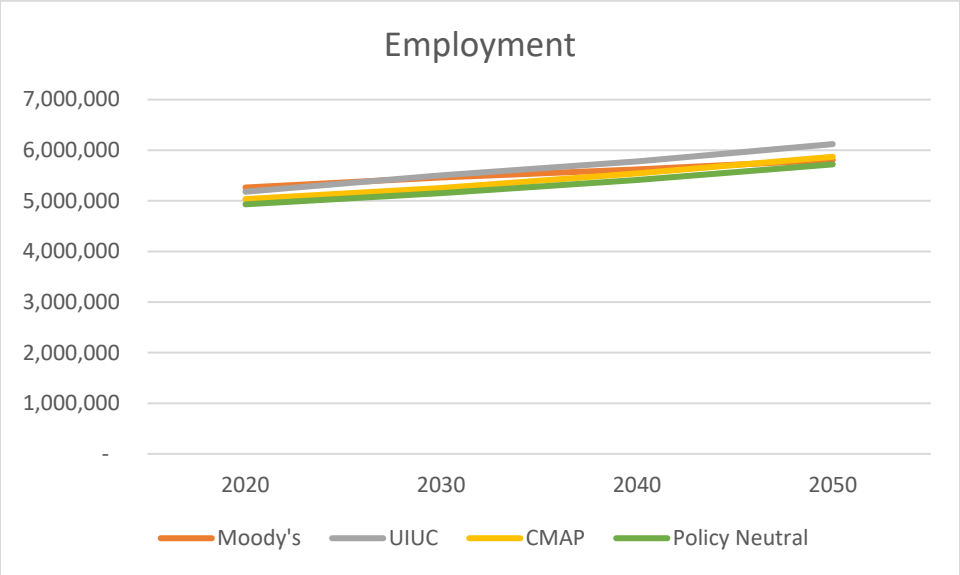


Figure 8: Employment forecast comparison with benchmarks, modeling region

3 Technical Forecasting Process

The Policy-Neutral forecast is produced using two distinct methods applied to different parts of the modeling region. Within the seven Illinois counties surrounding Chicago (referred to as "Internal" in this report), current land use density is used to estimate future population and employment levels. For the remaining fourteen counties (referred to as "External"), locally-based and proprietary econometric future year benchmarks are used to adjust CMAP's ON TO 2050 forecast[20]. In Figure 10, the Internal area includes the geography covered by the fine-grained subzone grid consisting of the seven full Illinois

[19] Woods & Poole employment forecasts are shown in the table but not included in this chart due to a substantial variance in the total resulting from the use of a different definition of employment. Also see previous footnote.
[20] The External part of the modeling region covers about 60% of the land area but contains only about 20% of the population and 15% of its employment.

counties including and surrounding Cook[21]. The External area includes the remainder of the modeling region.[22]

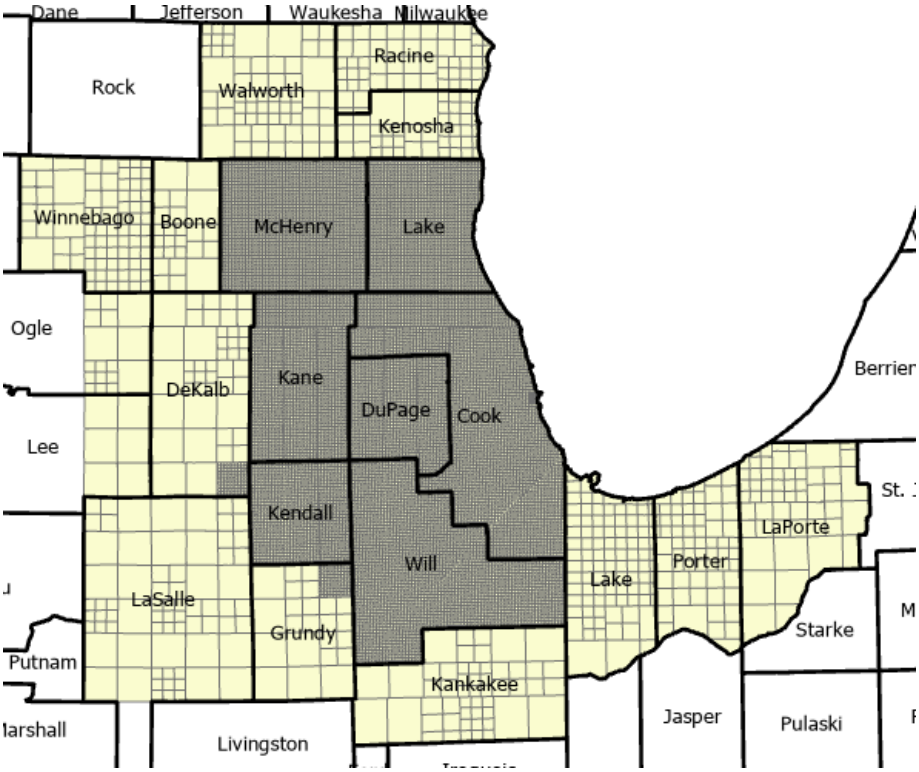


Figure 9: Counties in the CMAP modeling region with subzone grid shown.

3.1 Internal forecast calculation method

For the internal part of the region surrounding Chicago, information in the Land Use Inventory (LUI) is used both to calculate the density of existing residential or commercial development and to identify parcels available for new development. These land use characteristics are then matched to current population and employment values to calculate the "carrying capacity" for future growth. The carrying capacity calculation occurs in two steps. First, an average density of households and jobs surrounding a single subzone is calculated to determine the existing intensity of neighboring development that can be expected to influence future growth. Second, this average density is applied to vacant or agricultural land within the central subzone to provide the estimated number of households or jobs expected to eventually occupy those parcels. Technical details including an example of this calculation for a single subzone are found in Appendix B. The results of the carrying capacity calculation were validated by visually comparing aerial imagery with land use and base year socioeconomic data at the township level.

3.2 External forecast calculation method

Forecasts for the External area are calculated by adjusting CMAP's forecast to match the average of selected county estimates taken from the proprietary econometric future year benchmark sources as

[21] The three townships outside the seven counties covered by the fine-grained subzone grid are included in the External area.

[22] Note that only portions of primarily rural Lee, Ogle and LaSalle Counties are included in the modeling region.

well as available planning estimates of future population and employment prepared by neighboring Metropolitan Planning Organizations (MPOs). These include:

- **Northwestern Indiana Regional Planning Commission (NIRPC):** covering three complete counties in Indiana surrounding the city of Gary: Lake, Porter and LaPorte.
- **Southeastern Wisconsin Regional Planning Commission (SEWRPC):** covering several counties in Wisconsin surrounding the city of Milwaukee. Three of these are included in CMAP modeling region: Racine, Kenosha and Walworth.
- **Region 1 Planning Council (formerly RMAP):** covering several counties in Illinois surrounding the city of Rockford. Two of these are included in the CMAP modeling area: Winnebago and Boone.
- **Kankakee Area Transportation Study (KATS):** covering Kankakee County in Illinois including the city of Kankakee.

The remaining external counties in Illinois (DeKalb, Grundy, most of LaSalle and the eastern parts of Lee and Ogle counties) are primarily rural in character and served by small county governments. No locally generated population and employment forecasts were found for these jurisdictions. Proprietary benchmark estimates were used to adjust CMAP values for the portions of these counties included in the modeling region. Technical details, including the factors used to adjust the CMAP forecasts for the External counties, are found in Appendix C.

Appendix A. Definition of geographic units and district aggregations

The forecasts prepared in this study conform to the zone systems established by Chicago Metropolitan Agency for Planning in 2017 for use in regional travel demand modeling. The two coterminous zone systems are labeled respectively: "Zone17" and "Subzone17"[23]. See Figure 10 and Figure 11. Note that the geographic extent of this zone system is not entirely congruent with established county boundaries. In particular, only portions of primarily rural Lee, Ogle and LaSalle counties in Illinois are covered by the zone system.

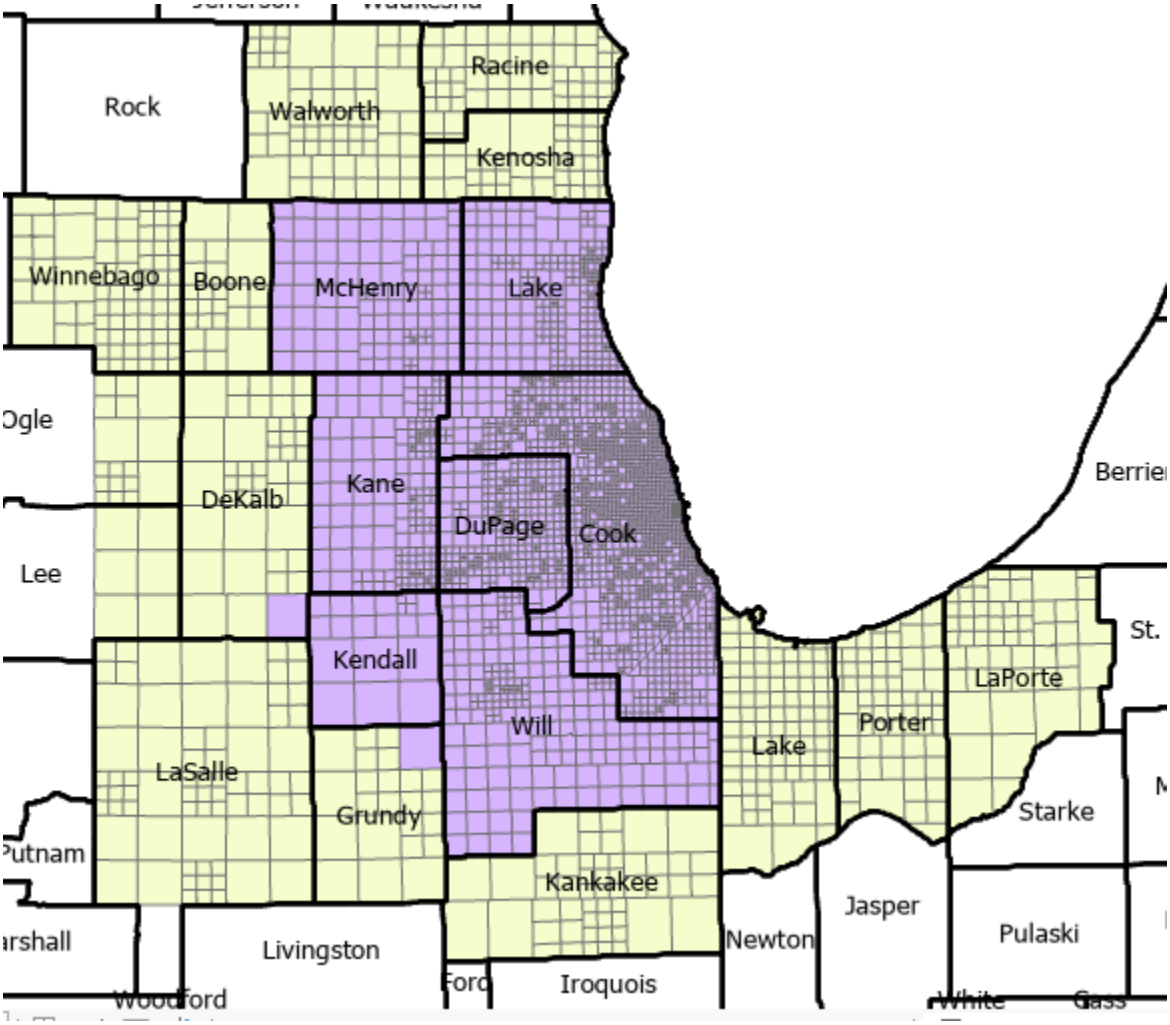


Figure 10: Study area defined by CMAP Zone17 modeling system

[23] The appended numerals refer to the year that CMAP established this zone and subzone system, distinguishing it from earlier versions (e.g. "Zone17" vs. "Zone09").

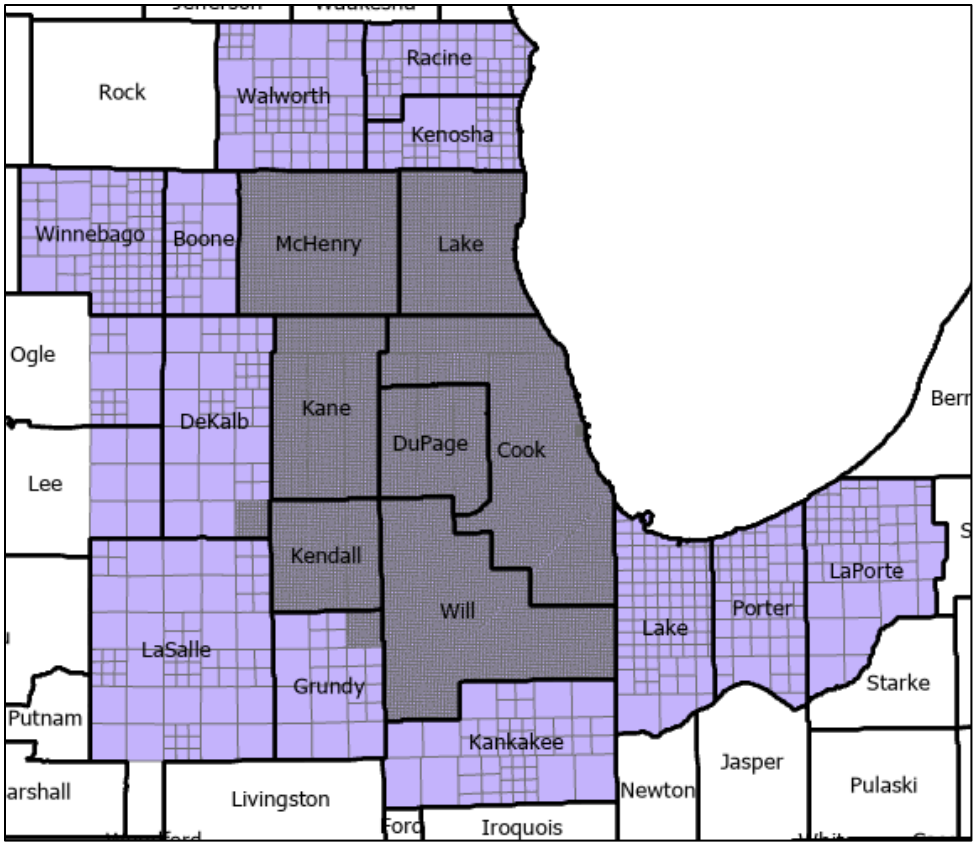


Figure 11: CMAP Subzone17 system. Denser grid is the CMAP Planning Area: 7 counties plus additional townships.

The origin-destination tables and traffic assignment steps of the regional travel demand model utilize the Zone17 Traffic Analysis Zone (TAZ) system. The socioeconomic forecasts, however, are developed at the finer-grained Subzone17 level. Because subzones are always coterminous with Zone17, the forecast results are easily aggregated for subsequent use in travel demand modeling.

All subzone boundaries conform to the United States Public Land Survey System (PLSS) developed originally for writing legal descriptions of individual parcels. In most of the Midwest, the PLSS consists of a regular grid of ¼-mile squares. The CMAP subzone system is based on this grid. There are 17,418 subzones in the 21-county CMAP modeling region. 16,714 of these subzones, at the fine-grained geography of ¼ square mile or less, cover the area within CMAP's official planning jurisdiction. Of these, 16,426 subzones are within the seven Illinois counties surrounding Chicago[24]. Outside the official CMAP planning area, the remainder of subzones are aggregated to larger PLSS units. Figure 12 gives a comparison of the number of zones and subzones found in each county.

[24] The seven full counties: Cook, DuPage, Kendall, Kane, Lake, McHenry and Will comprise the "Internal" area referenced throughout this report. Three urbanized townships included in CMAP's planning area: Aux Sable (in Grundy County) and Sandwich/Somonauk (in DeKalb County) are included in the "External" area.

				Number of CMAP Zone17 polygons	Number of CMAP Subzone17 polygons
District	State	County	County FIPS code		
Internal	IL	COOK	17031	1,732	3,895
		DUPAGE	17043	379	1,357
		KANE	17089	193	2,154
		KENDALL	17093	21	1,296
		LAKE	17097	258	1,896
		MCHENRY	17111	119	2,444
		WILL	17197	224	3,384
External	IL	BOONE	17007	25	25
		DEKALB	17037	46	189
		GRUNDY	17063	24	167
		KANKAKEE	17091	52	52
		LASALLE (part)	17099	72	72
		LEE (part)	17103	6	6
		OGLE (part)	17141	17	17
		WINNEBAGO	17201	79	79
	IN	LAKE	18089	97	97
		LAPORTE	18091	56	56
		PORTER	18127	67	67
	WI	KENOSHA	55059	45	45
		RACINE	55101	56	56
		WALWORTH	55127	64	64
All				3,632	17,418

Figure 12: CMAP modeling zone system. Count of Zone17 and Subzone17 by county.

Appendix B. Internal district forecast method

This appendix provides specific details of how carrying capacity is calculated within the 7-county internal portion of the CMAP modeling region and provides an example for a single subzone. Carrying capacity is based on two factors: the average household or job density in areas surrounding a specific subzone and the amount of developable land within that subzone.

The data resources used to calculate carrying capacity at the subzone level are readily available with no restrictions with respect to this scope-of-work.

- CMAP Trip Generation Zone (subzone17) Geography (the geographic unit of analysis)[25]
- CMAP C19Q1 Socioeconomic data for 2015 (households and jobs within subzones)[26]

[25]Chicago Metropolitan Agency for Planning, Trip Generation Zones, https://www.cmap.illinois.gov/data/transportation/modeling, retrieved 12/2019.
[26] Chicago Metropolitan Agency for Planning, 2019 First Quarter Conformity Analysis, https://www.cmap.illinois.gov/data/transportation/modeling, retrieved 12/2019.

- CMAP 2015 Land Use Inventory (parcel level land use data for density calculations and locations of developable land)[27]

Within the 7-county CMAP planning region covered by the Land Use Inventory (LUI), GIS software is used to generate buffer rings around each subzone at four successive radii: 0.75, 1.25, 1.75 and 2.25 miles. These half-mile increments have the effect of including an additional band of neighboring subzones with each successive ring. Within each buffer ring, the set of neighboring subzones is identified. Socioeconomic and land use attributes both within each subzone and among neighboring subzones within the buffer rings are then summed. This permits analysis of accumulated surrounding data to about 64 subzones comprising a ring 4.5 miles in diameter (about 16 square miles) centered on each centroid in the region. See Figure 13. Within each of these rings (inclusive of the interior rings), a list of summary statistics is tabulated from each centroid within the ring with the results being indexed to the current subzone record.

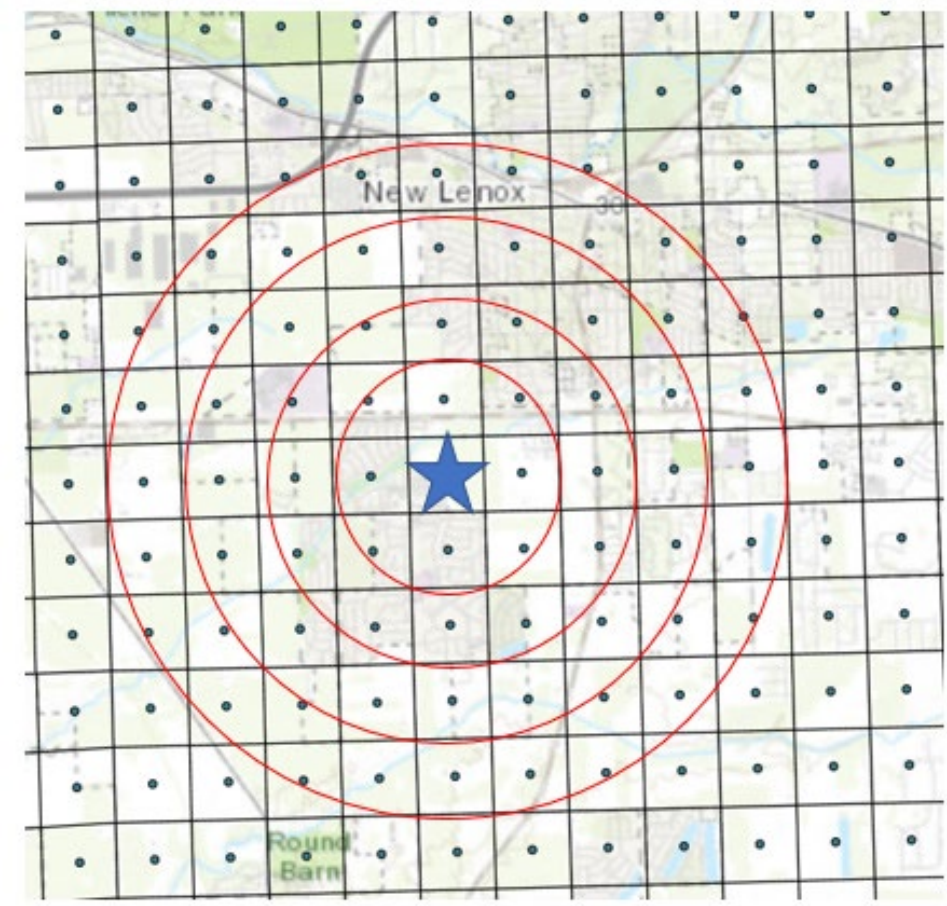


Figure 13: Example of selected subzone centroid and buffer polygons

Once assembled, the variables are organized and simplified for subsequent use. In particular, the multiple land use categories found in the Land Use Inventory (LUI) are distilled into three main categories: developed, developable and undevelopable. Depending on certain characteristics (e.g.

[27] Chicago Metropolitan Agency for Planning, 2015 Land Use Inventory. https://www.cmap.illinois.gov/data/land-use. Retrieved 12/2019.

schools, land platted for a specific use), additional distinctions are made to guide the carrying capacity calculation.

Average household and employment densities are then calculated for each buffer surrounding an individual subzone[28]. The resulting set of five values (one value for each buffer plus the central subzone itself) establishes a vector of the change in average density at increasing distances from the central subzone representing a function of the prevailing land use within and surrounding each subzone. The average density calculation does not directly weight the buffers based on their size or distance from the subzone centroid. But because each successive buffer includes the centroids from the buffer contained within, the smaller and closer-in buffers are represented more than once. This effectively establishes a distance-decay weight on the density calculation.

For each subzone, an average density (with its attendant percent standard deviation) is taken from the density calculations comprising each buffer. In this application, the average household density within 2.25 miles of the subzone centroid is used for the household carrying capacity calculation. Because employment tends to be concentrated within smaller areas of land at higher density, the average employment density within 0.75 miles of the subzone centroid is used for the employment carrying capacity calculation.

Location of subzones having >30,000 jobs per square mile (2015)	2050 Policy -Neutral Employment Forecast constrained by developable land	2050 Policy-Neutral Employment Forecast unconstrained by developable land in subzones with more than 30,000 jobs/square mile
Chicago CBD	552,929	763,031
Chicago balance	159,338	210,646
Cook County balance	79,395	98,205
DuPage County	17,120	30,215
Lake County	7,882	13,152
Total	816,664	1,115,249

Figure 14: Comparison of Policy-Neutral forecasts in high-density job centers

The employment carrying capacity in subzones exceeding 30,000 jobs per square mile (e.g. Chicago CBD, Schaumburg, Oak Brook) is not constrained by the amount of developable land available in recognition of the more intensive property utilization techniques available for high-density commercial and office uses to accommodate additional employees (e.g. multi-story buildings). In these locations the average employee densities are applied to all undeveloped and developed land. The effect of relaxing this constraint is shown in Figure 14.

[28] Note regarding school employment: School locations are typically located within the residential communities they serve and do not cluster with other non-residential land uses. Therefore, school employment is removed from the employment density calculation to avoid propagating new employment within predominantly residential areas. The number of school jobs, however, is retained and contributes to the total employment for the subzone.

Example of carrying capacity calculation for a single subzone

The following example is provided as a "walk-through" of the carrying capacity calculation for a single subzone located on the western edge of the village of Plainfield, Illinois in a rapidly urbanizing part of Will County. See Figure 15.

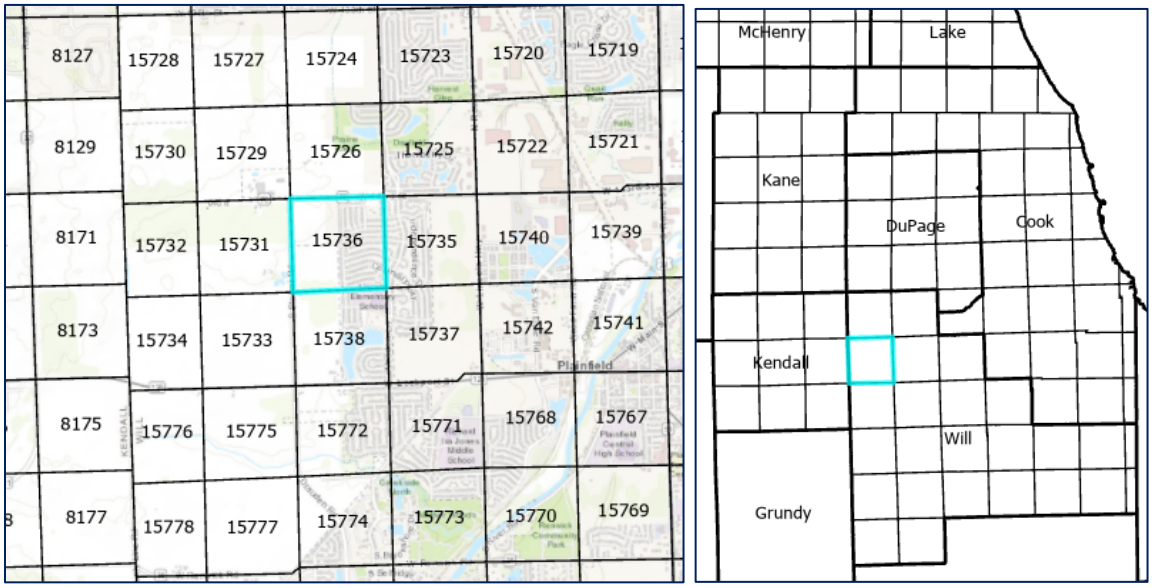


Figure 15: Highlighted subzone 15736 in Plainfield Township, Will County

The CMAP subzone17 identified as number 15736 is selected because it provides a good example of the influence that existing density plays on the calculated carrying capacity for adjacent vacant or agricultural land. Aerial imagery overlaid on Land Use Inventory data confirms the presence of undeveloped land to the west and suburban densities to the east with considerable developable land remaining within the subzone itself. See Figure 16.

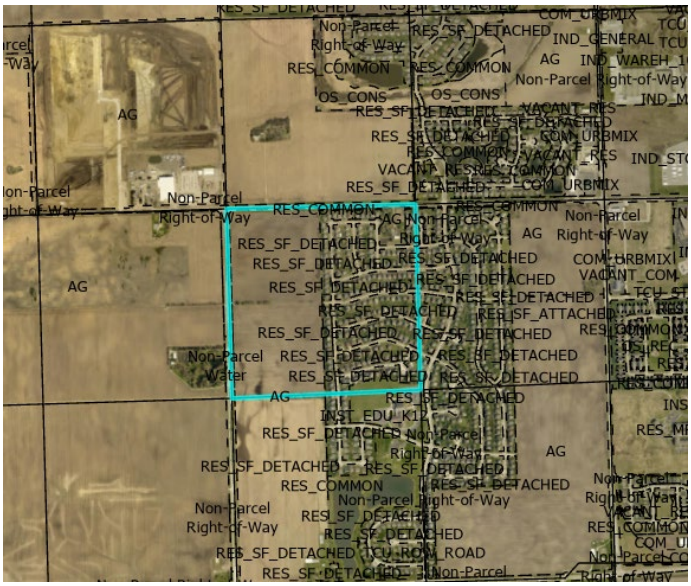


Figure 16: Highlighted subzone 15736 with aerial imagery and Land Use Inventory data

Figure 17 is a table showing the variables and values used in calculating the carrying capacity for subzone 15736.

Variable#	Variable Label	Variable Name	Value
v1	CMAP subzone17 id	subzone17	15736
v2	total square miles	sqmi	0.24799
v3	residential developed square miles	lu13	0.086616
v4	non-residential developed square miles	lu25	0
v5	developable square miles	lu3	0.12525
v6	2015 Households	i13	218
v7	2015 Total Employment	i25	2
v8	CMAP 2050 Households	j13	516
v9	CMAP 2050 Total Employment	j25	99
v10	i13 within 0.75 miles	i13sum075	867
v11	i13 within 1.25 miles	i13sum125	2054
v12	i13 within 1.75 miles	i13sum175	3838
v13	i13 within 2.25 miles	i13sum225	7252
v14	i25 within 0.75 miles	i25sum075	183
v15	i25 within 1.25 miles	i25sum125	1340
v16	i25 within 1.75 miles	i25sum175	2471
v17	i25 within 2.25 miles	i25sum225	4353
v18	lu13 within 0.75 miles	lu13sum075	0.82281
v19	lu13 within 1.25 miles	lu13sum125	1.44978
v20	lu13 within 1.75 miles	lu13sum175	3.31255
v21	lu13 within 2.25 miles	lu13sum225	5.77682
v22	lu25 within 0.75 miles	lu25sum075	0.32025
v23	lu25 within 1.25 miles	lu25sum125	0.67864
v24	lu25 within 1.75 miles	lu25sum175	1.43391
v25	lu25 within 2.25 miles	lu25sum225	2.412
v26	i13/lu13 within subzone[29]	i13lu13	1053.71
v27	13/lu13 within 0.75 miles	i13lu13_075	1053.71
v28	i13/lu13 within 1.25 miles	i13lu13_125	1416.77
v29	i13/lu13 within 1.75 miles	i13lu13_175	1158.62
v30	i13/lu13 within 2.25 miles	i13lu13_225	1255.36
v31	i25/lu25 in subzone	i25lu25	571.433
v32	i25/lu25 within 0.75 miles	i25lu25_075	571.433
v33	i25/lu25 within 1.25 miles	i25lu25_125	1974.52
v34	i25/lu25 within 1.75 miles	i25lu25_175	1723.26
v35	i25/lu25 within 2.25 miles	i25lu25_225	1804.73
v36	Household density in buffer	i13df	1187.63
v37	Household carrying capacity	i13cc	326.586
v38	employment density in buffer	i25df	571.433
v39	employment carrying capacity	i25cc	21.3261
v40	mean(i13/(i13+i25) including buffer	i13i25mix	0.72998
v41	household carrying capacity growth	i13g	108.586
v42	employment carrying capacity growth	i25g	19.3261

Figure 17: Input and output values used in calculating carrying capacity for subzone 15736

[29] Note that density values for larger buffers carry over to the smaller buffers when little or no land use is present to provide a valid density.

Following is a generalized narrative describing the household carrying capacity calculation.

- In 2015 there were 218 households in subzone 15736 (v6)
- About 0.13 square miles remain available for future development (v5)
- The average household density within the 2.25 buffer is about 1188 households per square mile (v36), based on the average of v26 through v30
- The average household/employment mix for 2015, including the central subzone is about 73% (v40=mean((v6/(v6+v7)) + (v10/(v10+v14)) +…+ (v13/(v13/v17))))
- The household/employment mix is applied to the amount of available land; about 0.09 square miles (v40*v5)
- This results in carrying capacity for about 109 new households (v40*v5*v36=v41)
- Adding the new households to the existing households results in a forecast value for the entire subzone of 327 households (v41+v6=v37)

Following is a generalized narrative describing the employment carrying capacity calculation.

- In 2015 there were 2 jobs in subzone 15736 (v7)
- About 0.13 square miles remain available for future development (v5)
- The average employment density within the 0.75 buffer is about 571 jobs per square mile (v38), based on the average of v31 through v32[30]
- The average household/employment mix for 2015, including the central subzone is about 73% (v40=mean((v6/(v6+v7))+(v10/(v10+v14))+…+(v13/(v13/v17))))
- The employment/household mix is applied to the amount of available land; about 0.03 square miles ((1-v40)*v5)
- This results in carrying capacity for about 19 new jobs ((1-v40)*v5*v38=v42)
- Adding the new jobs to the existing jobs results in a forecast value for the entire subzone of 21 jobs (v42+v7=v39)

Appendix C. External district forecast method

The forecast for the External district is the product of adjusting corresponding ON TO 2050 forecast values to more closely match outside (i.e. non-CMAP) benchmark estimates.

The non-CMAP sources were grouped and averaged by county to factor CMAP's estimate at the subzone level. Because these data sources are derived from different assumptions and methods, those selected for inclusion were determined on a case-by-case basis, guided by the need to keep the adjustments within an intuitive and reasonable range of each other. Non-CMAP sources with estimates that varied widely from the remaining sources (or were simply not available) were excluded from the adjustment calculation. In particular, Woods & Poole estimates were not included in the employment average due to the definition of a "job" resulting in a substantially larger value than the other sources.

Separate adjustment factors were calculated for Winnebago and Boone Counties (Region 1: RMAP) because they are directly served by an Illinois Tollway facility. Kankakee County's MPO (KATS) provided

[30] See previous note.

limited forecast information[31]. The Indiana and Wisconsin MPOs (NIRPC and SEWRPC) county-level forecasts rank differently than CMAP's estimate and thus are grouped into a single adjustment factor for each. The remaining primarily rural Illinois counties do not publish forecast data, so the proprietary sources are grouped and averaged for a single adjustment factor.

	2050 Population			2050 Employment		
County(ies)	CMAP	non-CMAP average	factor	CMAP	non-CMAP average	factor
Winnebago	350,474	320,478	0.91	161,028	154,224	0.96
Boone	85,651	74,777	0.87	22,953	24,641	1.07
Kankakee	140,341	132,869	0.95	49,641	50,509	1.02
INDIANA	798,998	792,987	0.99	292,639	335,506	1.15
WISCONSIN	557,592	522,396	0.94	229,016	241,099	1.05
ILLINOIS	341,126	302,157	0.89	108,847	121,676	1.12

Figure 18: External district factors used to adjust CMAP forecast

Figure 18 compares the different forecast values and shows the resulting adjustment factor. These factors are applied at the subzone-level within each county grouping.

Appendix D. Interim year interpolation method

The combined Internal and External methods result in subzone-level population and employment forecast values for the year 2050. Interim year estimates for 2020, 2030 and 2040 are needed for certain travel demand model applications.

To maintain the geographic continuity embedded in the subzone-level carrying capacity calculation, an exponential interpolation function is used to increment growth based on the percent standard deviation of development densities found in each subzone's buffer set. This function has the effect of allowing uniform growth over time in subzones surrounded by uniform density (i.e. low standard deviation), but delays growth in subzones surrounded by non-uniform density (i.e. high standard deviation). See Figure 19.

[31] Both RMAP and KATS forecast values were for year 2040. An average across all sources was taken for 2040 and then adjusted by CMAP's estimate 2050/2040 growth rate.

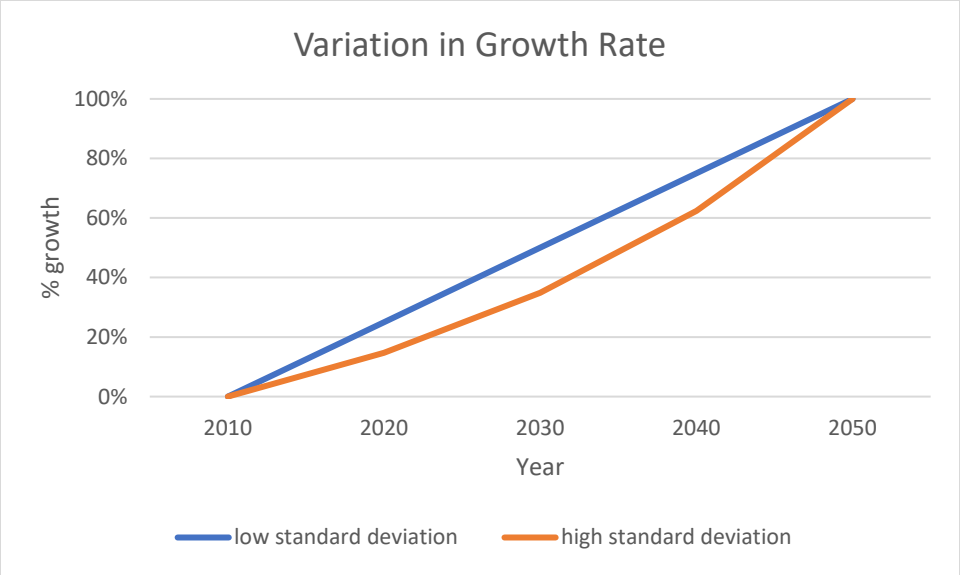


Figure 19: Linear versus log growth rate comparison.

Appendix E. Summary data tables by county

This appendix includes data tables and charts that allow comparison of base year, benchmark and forecast values at the county and sub-regional level.

Policy-Neutral population and employment forecasts

Figure 20 through Figure 23 provide county-level summaries of the Policy-Neutral and CMAP ON TO 2050 forecasts for the interim and horizon years. Figure 24 and Figure 25 provide a side-by-side comparison of the Policy-Neutral forecasts with the CMAP ON TO 2050 for the horizon year[32].

[32] The population forecasts are household-based. In the Policy-Neutral forecast, the average number of persons-per-households in each subzone is held constant throughout the forecast period. In the CMAP forecast, persons-per-household in each subzone varies throughout the forecast period.

			2015 Population	2020 Policy Neutral Population	2030 Policy Neutral Population	2040 Policy Neutral Population	2050 Policy Neutral Population
			Sum	Sum	Sum	Sum	Sum
district	State	County					
Internal	IL	COOK	5,148,908	5,189,941	5,273,467	5,359,026	5,446,731
		DUPAGE	921,429	924,403	930,561	937,016	943,793
		KANE	524,753	538,749	568,598	601,233	637,099
		KENDALL	123,038	137,499	168,515	202,720	240,690
		LAKE	686,299	694,625	711,955	730,258	749,632
		MCHENRY	305,787	320,549	351,897	385,957	423,119
		WILL	678,228	706,945	767,774	833,689	905,491
		SUBTOTAL	8,388,442	8,512,710	8,772,766	9,049,899	9,346,557
External	IL	County					
		BOONE	53,277	57,315	65,390	73,466	81,541
		DEKALB	97,986	105,229	119,714	134,199	148,685
		GRUNDY	50,251	54,914	64,239	73,564	82,890
		KANKAKEE	105,739	110,419	119,779	129,139	138,499
		LASALLE(part)	107,028	108,789	112,310	115,831	119,352
		LEE(part)	3,658	3,708	3,809	3,909	4,010
		OGLE(part)	18,724	19,117	19,903	20,689	21,475
		WINNEBAGO	282,381	291,276	309,066	326,856	344,646
		SUBTOTAL	719,044	750,766	814,210	877,653	941,097
	IN	County					
		LAKE	481,504	486,433	496,290	506,147	516,004
		LAPORTE	104,450	104,603	104,909	105,214	105,520
		PORTER	164,342	171,590	186,087	200,584	215,080
		SUBTOTAL	750,296	762,626	787,285	811,945	836,604
	WI	County					
		KENOSHA	164,059	173,291	191,754	210,218	228,681
		RACINE	190,229	194,670	203,551	212,433	221,314
		WALWORTH	100,217	104,515	113,110	121,705	130,300
		SUBTOTAL	454,505	472,475	508,415	544,355	580,295
TOTAL			10,312,287	10,498,577	10,882,676	11,283,853	11,704,553

Figure 20: Policy-Neutral population forecast summary by county

			2015 Population	2020 CMAP Population	2030 CMAP Population	2040 CMAP Population	2050 CMAP Population
			Sum	Sum	Sum	Sum	Sum
district	State	County					
Internal	IL	COOK	5,148,908	5,414,516	5,864,793	6,190,884	6,339,740
		DUPAGE	921,429	971,033	1,058,000	1,106,838	1,121,687
		KANE	524,753	564,959	641,088	722,756	808,861
		KENDALL	123,038	148,451	183,476	214,183	279,748
		LAKE	686,299	737,238	819,241	882,136	924,547
		MCHENRY	305,787	338,274	390,364	438,357	504,926
		WILL	678,228	739,194	839,976	943,424	1,092,794
		SUBTOTAL	8,388,442	8,913,665	9,796,939	10,498,577	11,072,302
External	IL	County					
		BOONE	53,277	58,660	68,243	77,138	85,651
		DEKALB	97,986	106,110	121,202	139,367	155,223
		GRUNDY	50,251	55,795	66,313	76,663	87,099
		KANKAKEE	105,739	114,060	125,751	133,885	140,341
		LASALLE(part)	107,028	112,134	117,180	118,905	120,941
		LEE(part)	3,658	3,805	3,974	4,044	4,055
		OGLE(part)	18,724	19,540	20,660	21,387	21,830
		WINNEBAGO	282,381	298,862	323,032	338,225	350,474
		SUBTOTAL	719,044	768,966	846,354	909,614	965,615
	IN	County					
		LAKE	481,504	493,740	510,423	517,291	516,266
		LAPORTE	104,450	106,823	108,863	107,961	105,528
		PORTER	164,342	172,482	190,537	204,678	215,465
		SUBTOTAL	750,296	773,045	809,823	829,930	837,259
	WI	County					
		KENOSHA	164,059	175,896	196,863	214,860	233,035
		RACINE	190,229	199,471	212,771	219,065	223,409
		WALWORTH	100,217	107,109	119,060	127,904	132,327
		SUBTOTAL	454,505	482,476	528,694	561,829	588,770
TOTAL			10,312,287	10,938,151	11,981,811	12,799,950	13,463,945

Figure 21: CMAP ON TO 2050 population forecast summary by county

			2015 Employment	2020 Policy Neutral Employment	2030 Policy Neutral Employment	2040 Policy Neutral Employment	2050 Policy Neutral Employment
			Sum	Sum	Sum	Sum	Sum
district	State	County					
Internal	IL	COOK	2,591,153	2,631,606	2,722,665	2,830,037	2,957,915
		DUPAGE	615,430	620,470	631,495	644,001	658,326
		KANE	210,578	216,163	236,776	262,263	294,694
		KENDALL	27,473	31,331	39,851	49,778	61,657
		LAKE	338,104	344,823	360,235	379,023	402,399
		MCHENRY	98,158	101,678	115,263	131,323	150,789
		WILL	204,604	216,203	243,166	276,733	319,509
		SUBTOTAL	4,085,500	4,162,275	4,349,451	4,573,157	4,845,289
External	IL	County					
		BOONE	17,215	18,095	19,855	21,615	23,375
		DEKALB	37,259	38,045	39,618	41,191	42,763
		GRUNDY	18,632	19,160	20,215	21,270	22,325
		KANKAKEE	42,985	43,952	45,887	47,822	49,757
		LASALLE(part)	43,412	43,622	44,042	44,463	44,883
		LEE(part)	254	254	254	253	253
		OGLE(part)	6,888	6,886	6,883	6,879	6,876
		WINNEBAGO	127,391	131,993	141,198	150,402	159,607
		SUBTOTAL	294,036	302,008	317,952	333,896	349,840
	IN	County					
		LAKE	185,816	184,515	181,912	179,310	176,707
		LAPORTE	40,463	41,306	42,992	44,679	46,365
		PORTER	58,731	60,439	63,854	67,269	70,684
		SUBTOTAL	285,010	286,260	288,759	291,258	293,757
	WI	County					
		KENOSHA	59,214	62,781	69,915	77,049	84,183
		RACINE	73,731	76,670	82,548	88,426	94,304
		WALWORTH	40,062	41,979	45,814	49,649	53,484
		SUBTOTAL	173,007	181,430	198,277	215,124	231,971
TOTAL			4,837,553	4,931,973	5,154,438	5,413,435	5,720,856

Figure 22: Policy-Neutral employment forecast summary by county

			2015 Employment	2020 CMAP Employment	2030 CMAP Employment	2040 CMAP Employment	2050 CMAP Employment
			Sum	Sum	Sum	Sum	Sum
district	State	County					
Internal	IL	COOK	2,591,153	2,690,153	2,792,464	2,910,791	3,009,412
		DUPAGE	615,430	632,489	656,280	684,282	707,881
		KANE	210,578	222,797	237,637	262,759	301,364
		KENDALL	27,473	28,505	32,250	38,538	53,846
		LAKE	338,104	350,312	368,695	391,652	416,748
		MCHENRY	98,158	102,317	111,750	125,251	148,335
		WILL	204,604	233,915	257,850	296,712	361,851
		SUBTOTAL	4,085,500	4,260,488	4,456,926	4,709,985	4,999,437
External	IL	County					
		BOONE	17,215	20,381	20,983	21,926	22,953
		DEKALB	37,259	37,453	38,558	40,292	42,183
		GRUNDY	18,632	19,475	20,057	20,957	21,936
		KANKAKEE	42,985	44,075	45,378	47,422	49,641
		LASALLE(part)	43,412	39,712	40,895	42,720	44,728
		LEE(part)	254	225	231	239	253
		OGLE(part)	6,888	6,104	6,289	6,566	6,877
		WINNEBAGO	127,391	142,971	147,206	153,810	161,028
		SUBTOTAL	294,036	310,396	319,597	333,932	349,599
	IN	County					
		LAKE	185,816	157,930	162,600	169,910	177,871
		LAPORTE	40,463	40,496	41,697	43,568	45,611
		PORTER	58,731	61,400	63,212	66,057	69,157
		SUBTOTAL	285,010	259,826	267,509	279,535	292,639
	WI	County					
		KENOSHA	59,214	73,627	75,814	79,212	82,932
		RACINE	73,731	82,809	85,259	89,091	93,273
		WALWORTH	40,062	46,893	48,276	50,450	52,811
		SUBTOTAL	173,007	203,329	209,349	218,753	229,016
TOTAL			4,837,553	5,034,039	5,253,381	5,542,205	5,870,691

Figure 23: CMAP ON TO 2050 employment forecast summary by county

			2015 Population	2050 Policy Neutral Population	2050 CMAP Population
			Sum	Sum	Sum
district	State	County			
Internal	IL	COOK	5,148,908	5,446,731	6,339,740
		DUPAGE	921,429	943,793	1,121,687
		KANE	524,753	637,099	808,861
		KENDALL	123,038	240,690	279,748
		LAKE	686,299	749,632	924,547
		MCHENRY	305,787	423,119	504,926
		WILL	678,228	905,491	1,092,794
		SUBTOTAL	8,388,442	9,346,557	11,072,302
External	IL	County			
		BOONE	53,277	81,541	85,651
		DEKALB	97,986	148,685	155,223
		GRUNDY	50,251	82,890	87,099
		KANKAKEE	105,739	138,499	140,341
		LASALLE(part)	107,028	119,352	120,941
		LEE(part)	3,658	4,010	4,055
		OGLE(part)	18,724	21,475	21,830
		WINNEBAGO	282,381	344,646	350,474
		SUBTOTAL	719,044	941,097	965,615
	IN	County			
		LAKE	481,504	516,004	516,266
		LAPORTE	104,450	105,520	105,528
		PORTER	164,342	215,080	215,465
		SUBTOTAL	750,296	836,604	837,259
	WI	County			
		KENOSHA	164,059	228,681	233,035
		RACINE	190,229	221,314	223,409
		WALWORTH	100,217	130,300	132,327
		SUBTOTAL	454,505	580,295	588,770
TOTAL			10,312,287	11,704,553	13,463,945

Figure 24: Comparison of Policy-Neutral and CMAP ON TO 2050 population forecast summary by county

			2015 Employment	2050 Policy Neutral Employment	2050 CMAP Employment
			Sum	Sum	Sum
district	State	County			
Internal	IL	COOK	2,591,153	2,957,915	3,009,412
		DUPAGE	615,430	658,326	707,881
		KANE	210,578	294,694	301,364
		KENDALL	27,473	61,657	53,846
		LAKE	338,104	402,399	416,748
		MCHENRY	98,158	150,789	148,335
		WILL	204,604	319,509	361,851
		SUBTOTAL	4,085,500	4,845,289	4,999,437
External	IL	County			
		BOONE	17,215	23,375	22,953
		DEKALB	37,259	42,763	42,183
		GRUNDY	18,632	22,325	21,936
		KANKAKEE	42,985	49,757	49,641
		LASALLE(part)	43,412	44,883	44,728
		LEE(part)	254	253	253
		OGLE(part)	6,888	6,876	6,877
		WINNEBAGO	127,391	159,607	161,028
		SUBTOTAL	294,036	349,840	349,599
	IN	County			
		LAKE	185,816	176,707	177,871
		LAPORTE	40,463	46,365	45,611
		PORTER	58,731	70,684	69,157
		SUBTOTAL	285,010	293,757	292,639
	WI	County			
		KENOSHA	59,214	84,183	82,932
		RACINE	73,731	94,304	93,273
		WALWORTH	40,062	53,484	52,811
		SUBTOTAL	173,007	231,971	229,016
TOTAL			4,837,553	5,720,856	5,870,691

Figure 25: Comparison of Policy-Neutral and CMAP ON TO 2050 employment forecast summary by county

County-level comparison of Policy-Neutral forecasts to future-year benchmarks

Following are county-level summary tables comparing forecasts with corresponding benchmarks. The future years shown are 2020, 2030, 2040 and 2050. Woods & Poole (W&P)[33], Moody's[34] and University of Illinois at Urbana Champaign Regional Economics Application Laboratory (UIUC)[35] use proprietary econometric models. Also included are forecasts tabulated from data provided by Chicago Metropolitan Agency for Planning (CMAP) for use in the ON TO 2050 Regional Comprehensive Plan[36] as well as forecast estimates from neighboring MPOs where available.

Because Woods & Poole uses a substantially different definition of a "job", its employment forecast appears in the tables, but is omitted from the employment charts. Alternate definitions of employment among the remaining sources explain the initial differences between employment values. Limited comments are included with a few counties providing clarification of problematic or counter-intuitive observations specific to each.

Internal District

The Internal district consists of the seven full Illinois counties surrounding Chicago. They are presented alphabetically: Cook, DuPage, Kane, Kendall, Lake, McHenry and Will; one county per page.

[33] Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2019. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of the licensee.

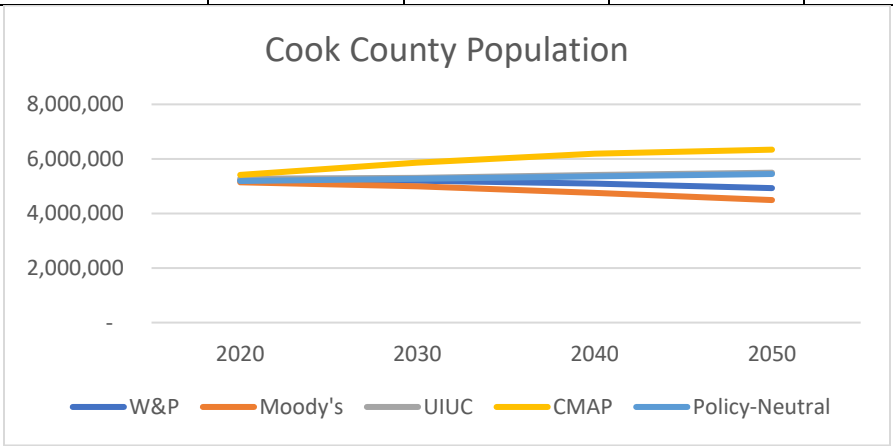
[34] Moody's Analytics, Economic Data and Forecasts, moodysanalytics.com

[35] The UIUC data used in this study is obtained from an earlier study provided by the client.

[36] CMAP, https://datahub.cmap.illinois.gov/, 2019Q1 conformity data sets.

Cook County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	5,219,069	5,202,677	5,096,094	4,929,696
Moody's	5,143,152	4,993,760	4,752,461	4,491,796
UIUC	5,275,116	5,306,635	5,412,954	5,495,659
CMAP	5,414,516	5,864,793	6,190,884	6,339,740
Policy-Neutral	5,189,941	5,273,467	5,359,026	5,446,731



Employment	2020[37]	2030	2040	2050
W&P	3,646,239	3,951,803	4,168,528	4,311,762
Moody's	2,770,590	2,844,266	2,903,670	2,980,594
UIUC	2,696,793	2,771,290	2,821,996	2,911,482
CMAP	2,690,153	2,792,464	2,910,791	3,009,412
Policy-Neutral	2,631,606	2,722,665	2,830,037	2,957,915

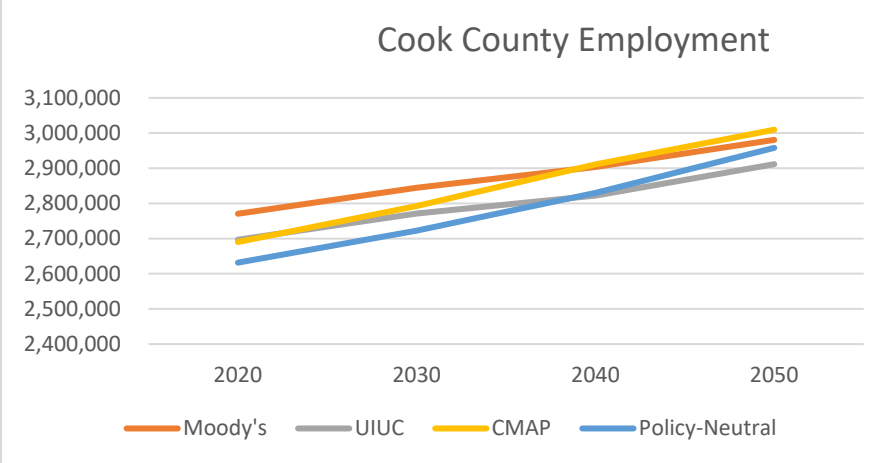
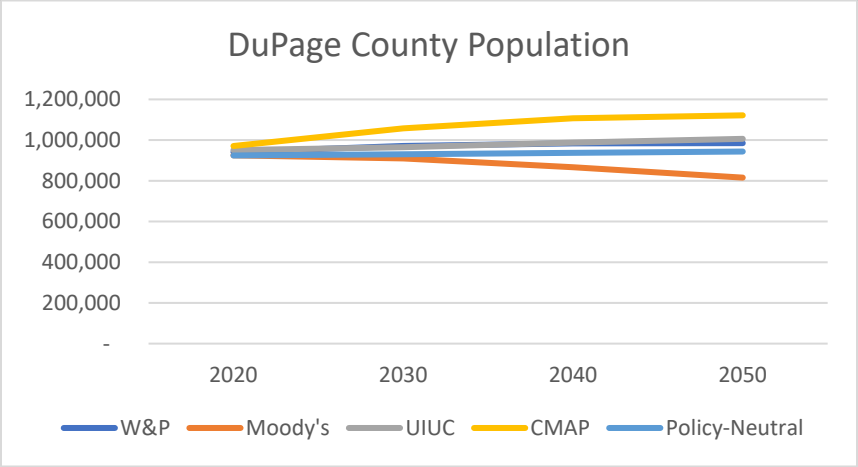


Figure 26: Cook County comparison of forecasts and benchmarks

[37] Cook County: CMAP and benchmark values vary initially at origin (2015). CMAP and Policy-Neutral values are identical at origin (2015) but diverge by 2020 due to differences in interim year calculation method.

DuPage County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	941,131	970,826	984,032	985,030
Moody's	925,121	909,973	866,453	815,588
UIUC	950,836	964,828	988,099	1,006,153
CMAP	971,033	1,058,000	1,106,838	1,121,687
Policy-Neutral	924,403	930,561	937,016	943,793



Employment	2020	2030	2040	2050
W&P	827,657	902,516	960,647	1,002,664
Moody's	666,047	692,683	707,517	723,298
UIUC	646,605	680,429	706,410	741,326
CMAP	632,489	656,280	684,282	707,881
Policy-Neutral	620,470	631,495	644,001	658,326

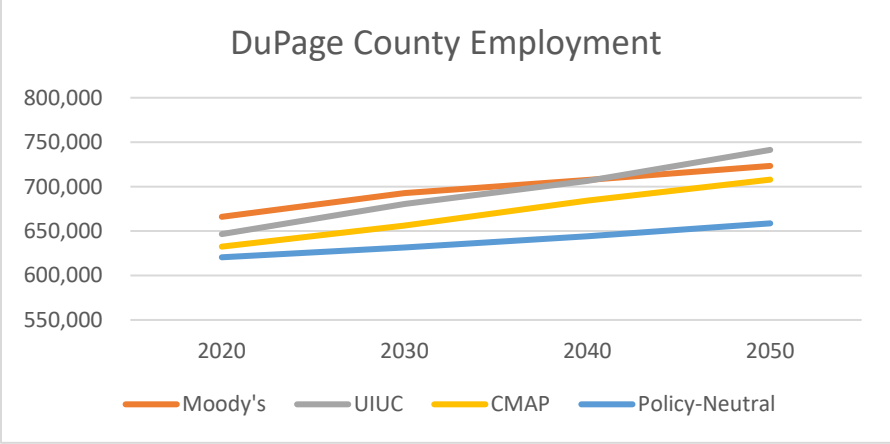
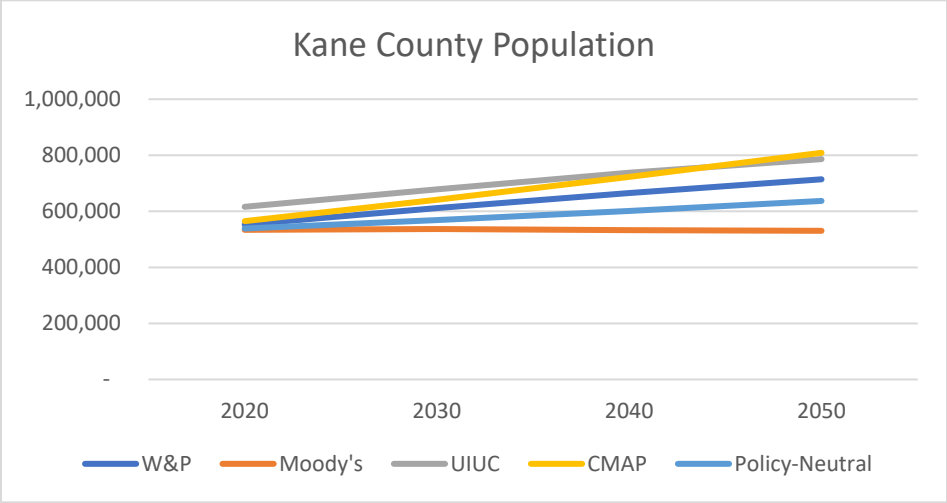


Figure 27: DuPage County comparison of forecasts and benchmarks

Kane County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	552,539	611,547	665,079	714,313
Moody's	533,797	536,825	532,838	530,439
UIUC	616,155	678,514	737,726	786,299
CMAP	564,959	641,088	722,756	808,861
Policy-Neutral	538,749	568,598	601,233	637,099



Employment	2020	2030	2040	2050
W&P	286,614	312,542	332,821	350,017
Moody's	228,792	247,431	263,109	281,147
UIUC	257,627	296,704	336,223	378,490
CMAP	222,797	237,637	262,759	301,364
Policy-Neutral	216,163	236,776	262,263	294,694

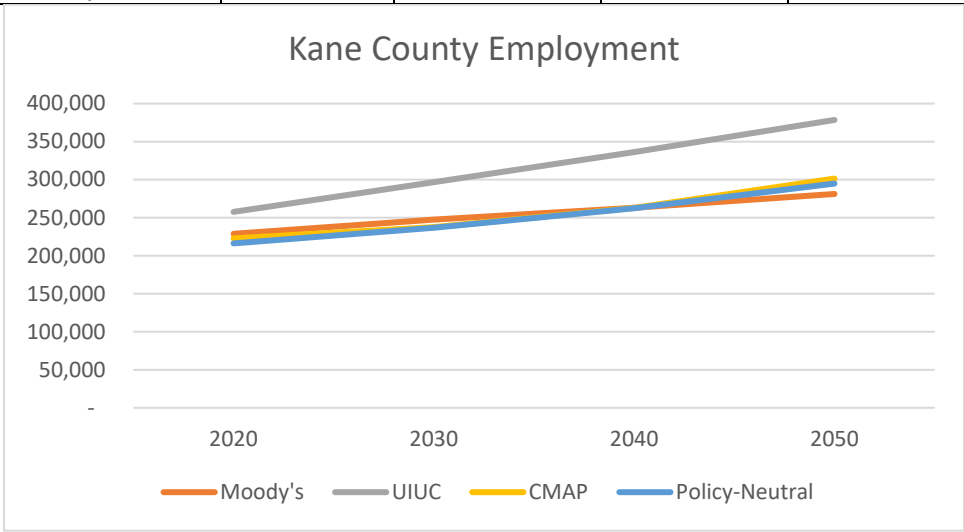
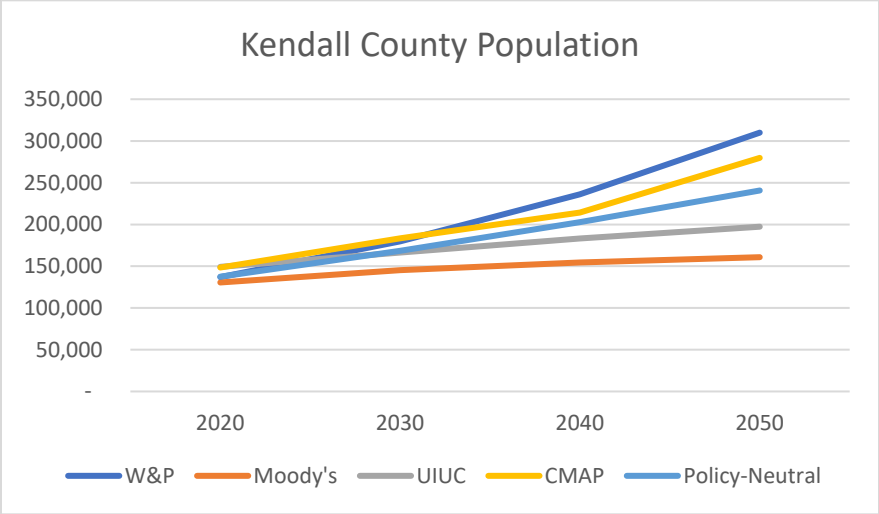


Figure 28: Kane County comparison of forecasts and benchmarks

Kendall County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	136,960	179,819	236,089	309,968
Moody's	130,537	145,287	154,520	160,820
UIUC	149,269	166,305	183,323	197,319
CMAP	148,451	183,476	214,183	279,748
Policy-Neutral	137,499	168,515	202,720	240,690



Employment	2020	2030	2040	2050
W&P	47,943	63,071	82,005	106,769
Moody's	31,250	36,774	41,955	47,423
UIUC	45,544	60,298	71,481	83,103
CMAP	28,505	32,250	38,538	53,846
Policy-Neutral	31,331	39,851	49,778	61,657

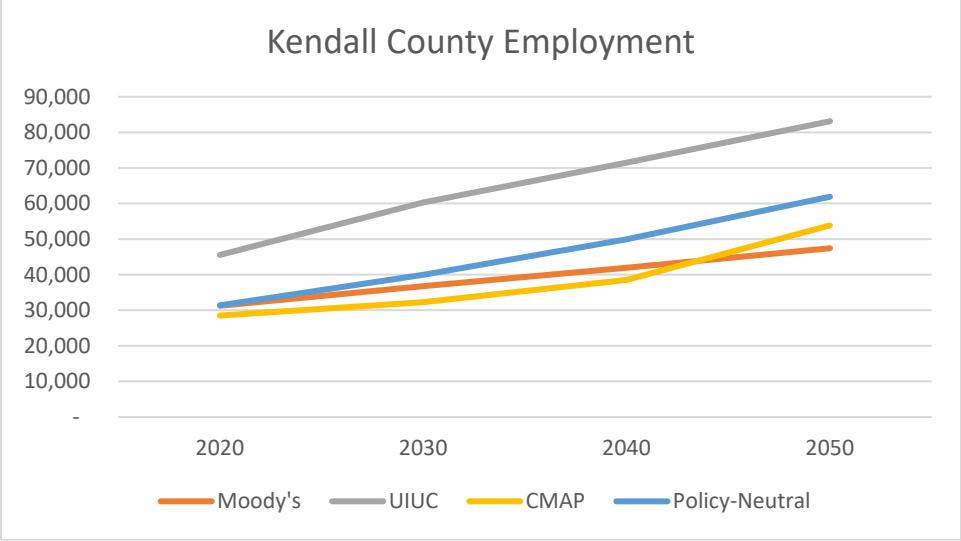
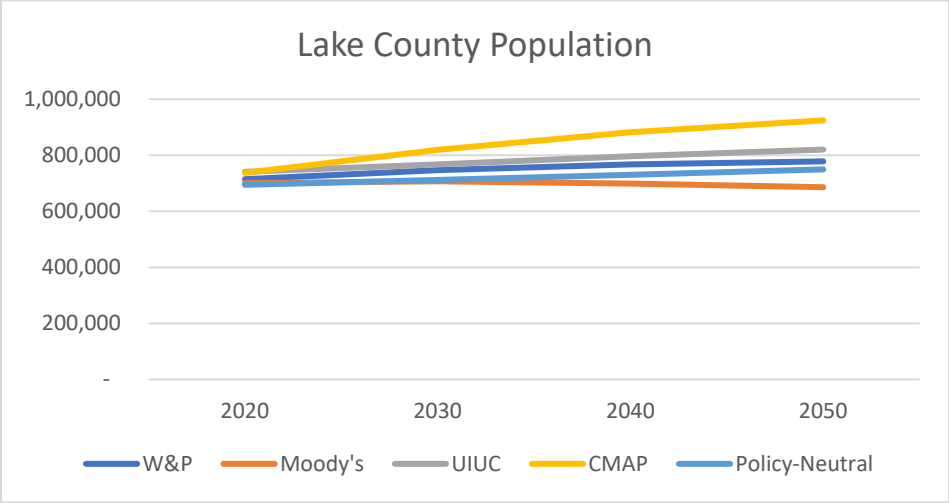


Figure 29: Kendall County comparison of forecasts and benchmarks

Lake County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	714,674	747,046	767,296	778,307
Moody's	700,450	707,229	698,769	686,063
UIUC	741,082	767,207	796,655	820,403
CMAP	737,238	819,241	882,136	924,547
Policy-Neutral	694,625	711,955	730,258	749,632



Employment	2020	2030	2040	2050
W&P	481,021	520,781	550,919	575,492
Moody's	363,086	382,306	399,632	421,062
UIUC	360,423	377,666	392,013	411,325
CMAP	350,312	368,695	391,652	416,748
Policy-Neutral	344,823	360,235	379,023	402,399

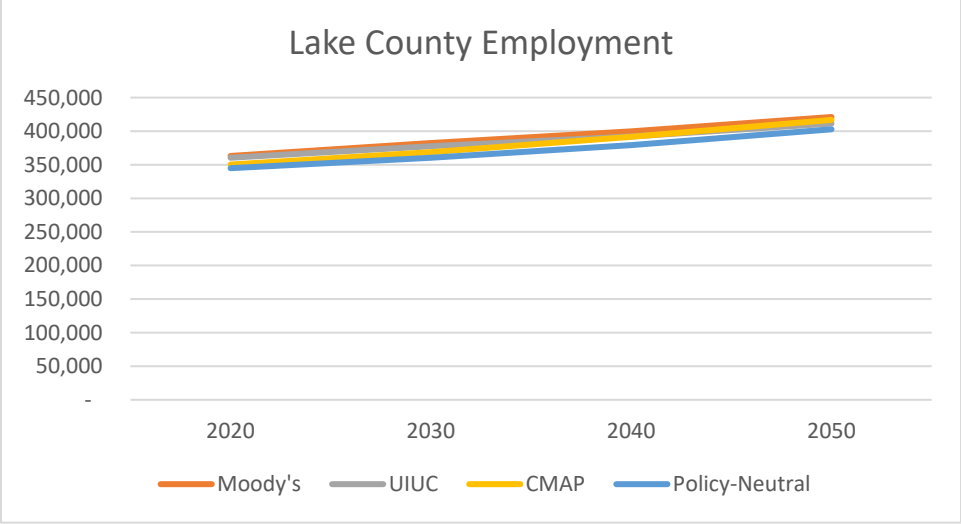
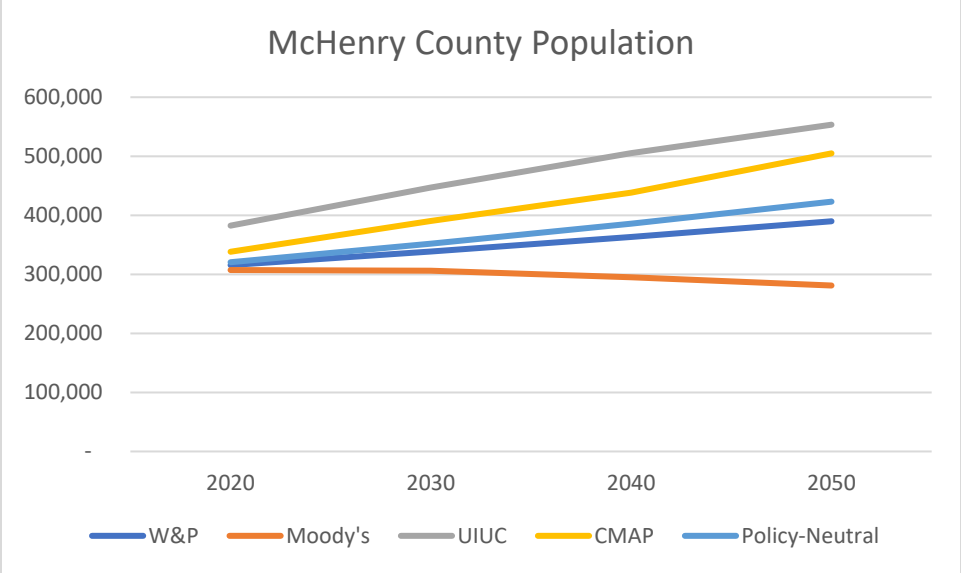


Figure 30: Lake County comparison of forecasts and benchmarks

McHenry County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	315,715	338,726	363,413	389,900
Moody's	307,304	306,169	295,099	281,079
UIUC	382,526	447,071	505,365	553,479
CMAP	338,274	390,364	438,357	504,926
Policy-Neutral	320,549	351,897	385,957	423,119



Employment	2020	2030	2040	2050
W&P	145,110	158,845	170,098	180,543
Moody's	106,398	112,080	115,883	119,876
UIUC	118,635	131,519	141,638	153,261
CMAP	102,317	111,750	125,251	148,335
Policy-Neutral	101,678	115,263	131,323	150,789

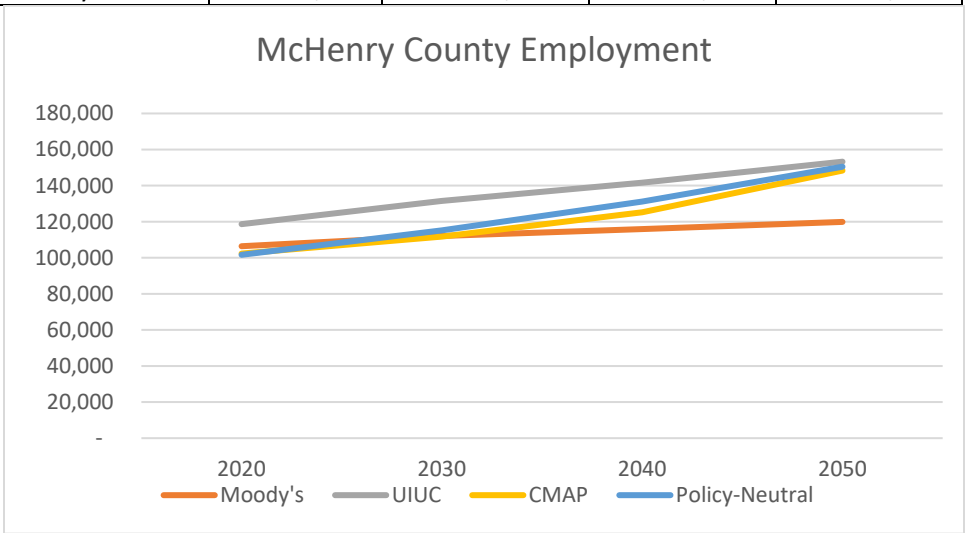
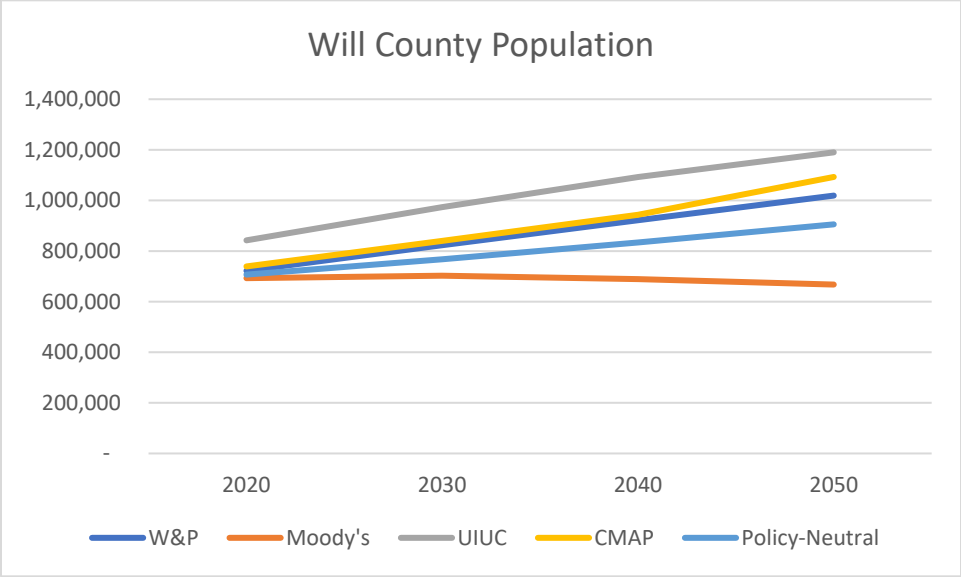


Figure 31: McHenry County comparison of forecasts and benchmarks

Will County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	722,122	822,955	921,550	1,019,139
Moody's	692,558	702,555	689,068	667,550
UIUC	842,300	973,876	1,092,365	1,190,072
CMAP	739,194	839,976	943,424	1,092,794
Policy-Neutral	706,945	767,774	833,689	905,491



Employment	2020	2030	2040	2050
W&P	358,510	449,345	552,243	667,485
Moody's	252,349	270,661	284,769	299,619
UIUC	278,509	333,407	388,486	446,204
CMAP	233,915	257,850	296,712	361,851
Policy-Neutral	216,203	243,166	276,733	319,509

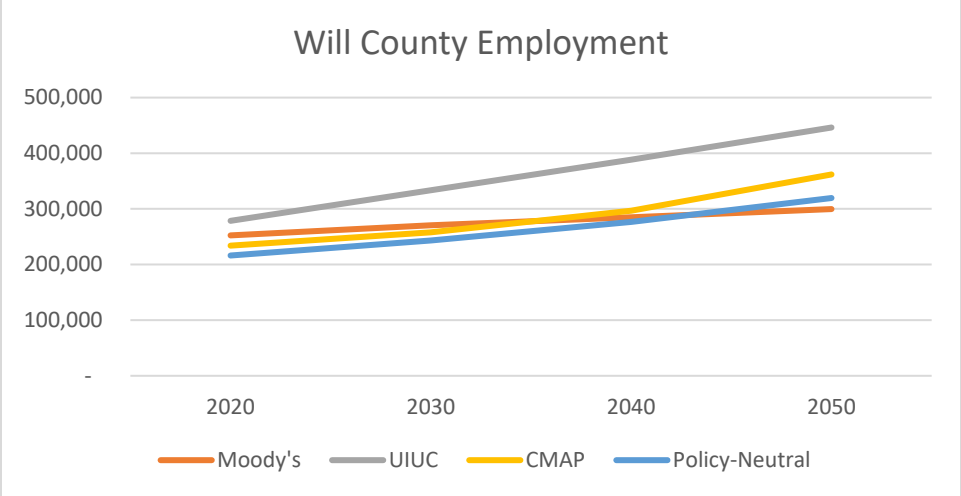


Figure 32: Will County comparison of forecasts and benchmarks

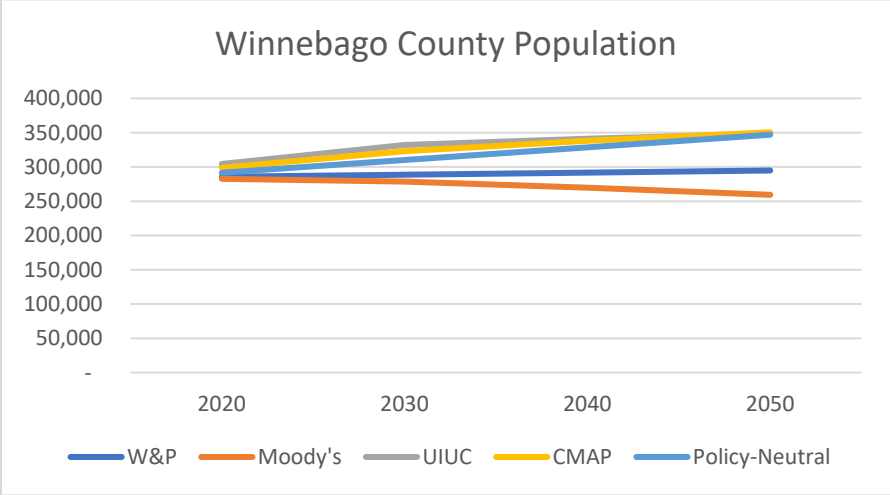
External District

The External district consists of all or part of the remaining 14 counties covered by the CMAP modeling zone system. MPO counties (non-CMAP) in Illinois, Indiana and Wisconsin are presented first, followed by the remaining non-MPO counties in Illinois. In order: ILLINOIS: Winnebago, Boone, Kankakee. INDIANA: Lake, Porter, LaPorte. WISCONSIN: Kenosha, Racine, Walworth. ILLINOIS: DeKalb, Grundy and LaSalle.

County-level summaries for the portions of primarily rural Lee and Ogle counties that are in the modeling zone system are not included in this section because the modeling zone system covers less than half the county while the benchmark estimates cover the full county. LaSalle County, however, is included because enough of the county is covered by the zone system to permit at least a general comparison to the benchmarks.

Winnebago County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	285,675	288,687	291,730	294,805
Moody's	282,676	278,669	269,628	259,355
UIUC	304,341	332,017	341,202	348,403
CMAP	298,862	323,032	338,225	350,474
RMAP			*334,548*	
Policy-Neutral	291,276	309,066	326,856	344,646



Employment	2020	2030	2040	2050
W&P	165,686	172,196	174,365	173,165
Moody's	136,182	142,246	147,311	153,139
UIUC	151,254	164,996	176,640	190,230
CMAP	142,971	147,206	153,810	161,028
RMAP			*187,790*	
Policy-Neutral	131,993	141,198	150,402	159,607

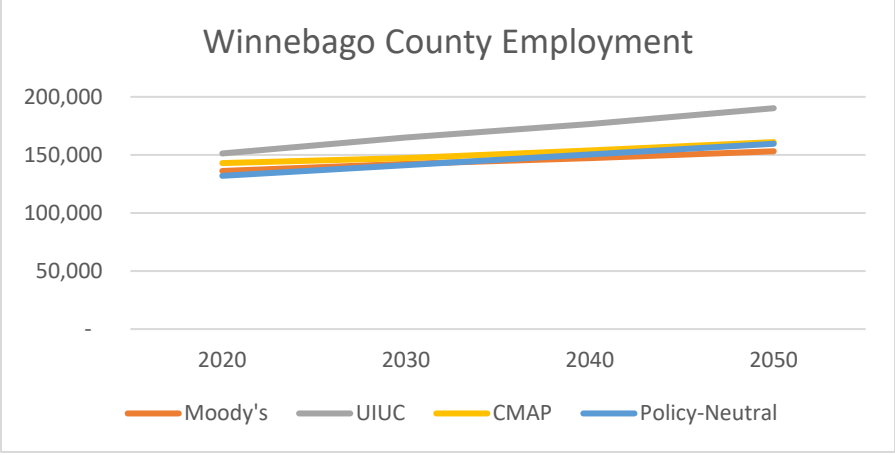
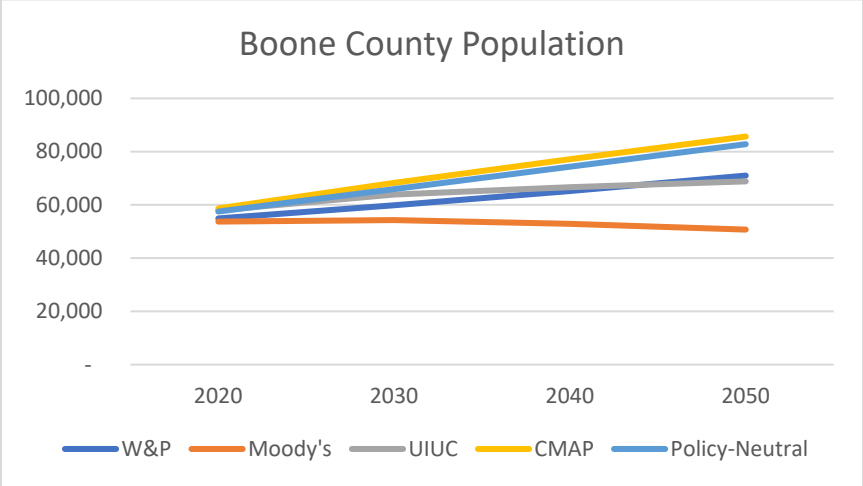


Figure 33: Winnebago County comparison of forecasts and benchmarks

Boone County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	54,906	59,817	65,168	70,997
Moody's	53,700	54,283	52,846	50,711
UIUC	57,962	63,845	66,609	68,827
CMAP	58,660	68,243	77,138	85,651
RMAP			*84,755*	
Policy-Neutral	57,315	65,390	73,466	81,541



Employment	2020	2030	2040	2050
W&P	24,639	28,421	32,564	37,469
Moody's	18,546	19,864	20,698	21,465
UIUC	19,664	21,749	23,574	25,645
CMAP	20,381	20,983	21,926	22,953
RMAP			*26,379*	
Policy-Neutral	18,095	19,855	21,615	23,375

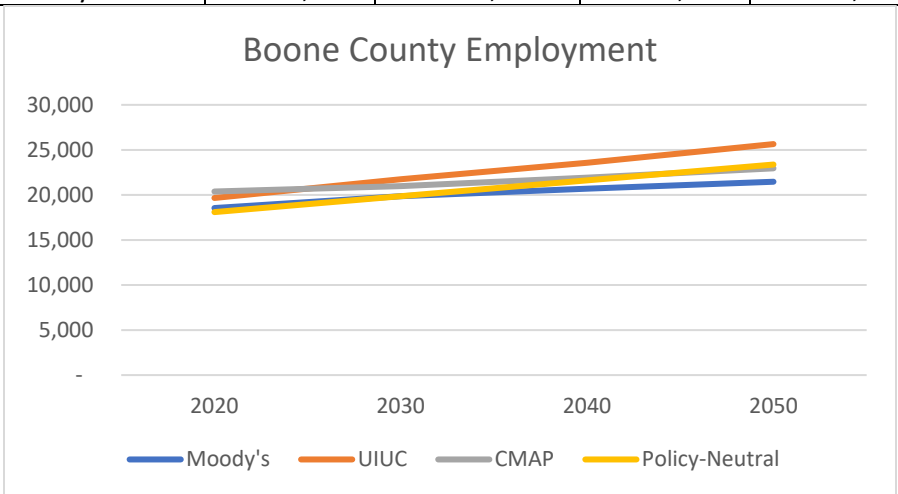
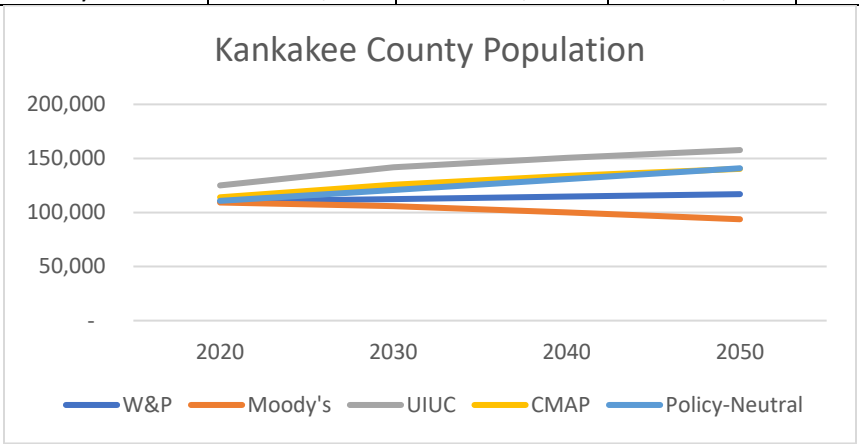


Figure 34: Boone County comparison of forecasts and benchmarks

Kankakee County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	110,254	112,445	114,680	116,960
Moody's	109,219	105,930	100,117	93,738
UIUC	125,049	141,859	150,621	157,741
CMAP	114,060	125,751	133,885	140,341
KATS			*141,610*	
Policy-Neutral	110,419	119,779	129,139	138,499



Employment	2020	2030	2040	2050
W&P	58,749	63,041	65,816	67,300
Moody's	46,541	47,618	48,251	49,051
UIUC	48,671	53,700	57,986	62,890
CMAP	44,075	45,378	47,422	49,641
			-	
Policy-Neutral	43,952	45,887	47,822	49,757

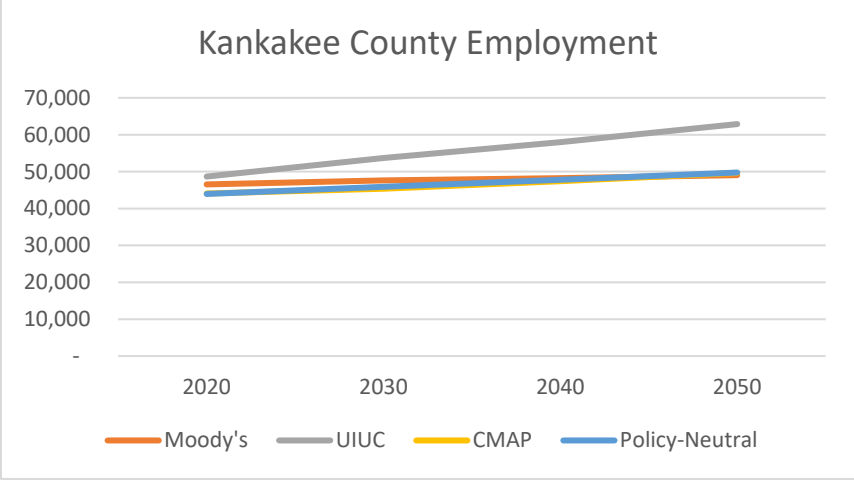
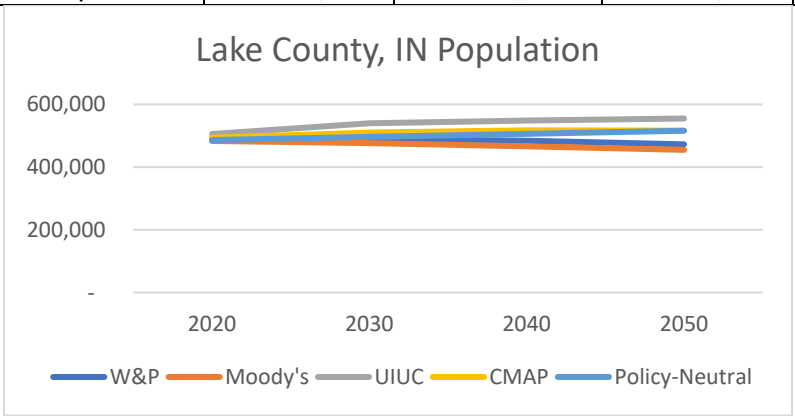


Figure 35: Kankakee County comparison of forecasts and benchmarks

Lake, IN County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	487,625	490,294	484,400	472,633
Moody's	483,395	476,632	466,474	455,114
UIUC	505,546	539,662	548,451	555,004
CMAP	493,740	510,423	517,291	516,266
NIRPC				*505,066*
Policy-Neutral	486,433	496,290	506,147	516,004



Employment	2020	2030	2040	2050
W&P	251,759	267,730	277,080	281,328
Moody's	200,216	202,250	204,208	205,391
UIUC	224,192	245,451	264,381	286,135
CMAP[38]	157,930	162,600	169,910	177,871
NIRPC				*214,783*
Policy-Neutral	184,515	181,912	179,310	176,707

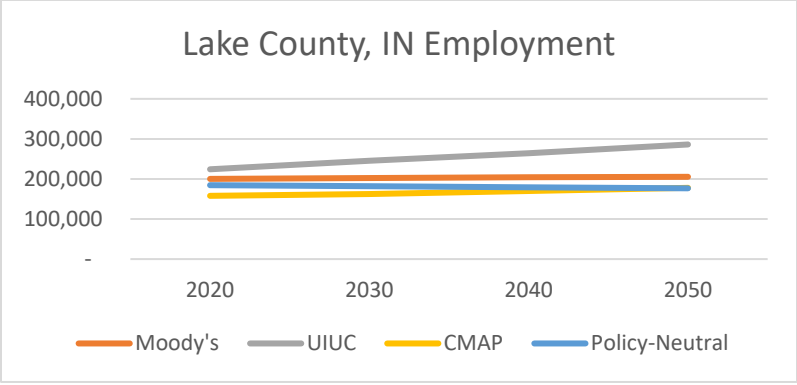
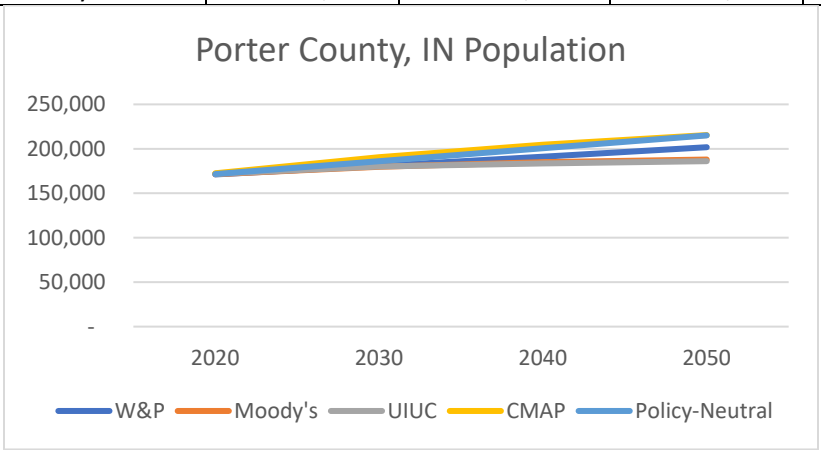


Figure 36: Lake County, IN comparison of forecasts and benchmarks

[38] Lake County, IN: The drop in CMAP employment from 2015 to 2020 appears to be an error. Lake County 2015 employment is 185,816. Note that Policy-Neutral forecast resolves with Moody's.

Porter County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	171,196	180,843	191,034	201,799
Moody's	171,504	179,863	184,938	187,946
UIUC	172,018	180,102	183,515	186,102
CMAP	172,482	190,537	204,678	215,465
NIRPC				*226,979*
Policy-Neutral	171,590	186,087	200,584	215,080



Employment	2020	2030	2040	2050
W&P	84,648	95,051	104,631	113,748
Moody's	65,436	70,306	74,579	78,134
UIUC	67,297	74,218	80,502	87,617
CMAP	61,400	63,212	66,057	69,157
NIRPC				*84,846*
Policy-Neutral	60,439	63,854	67,269	70,684

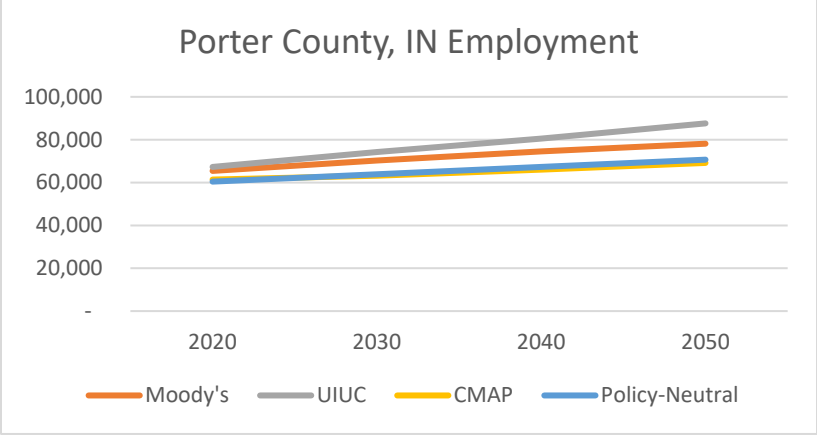
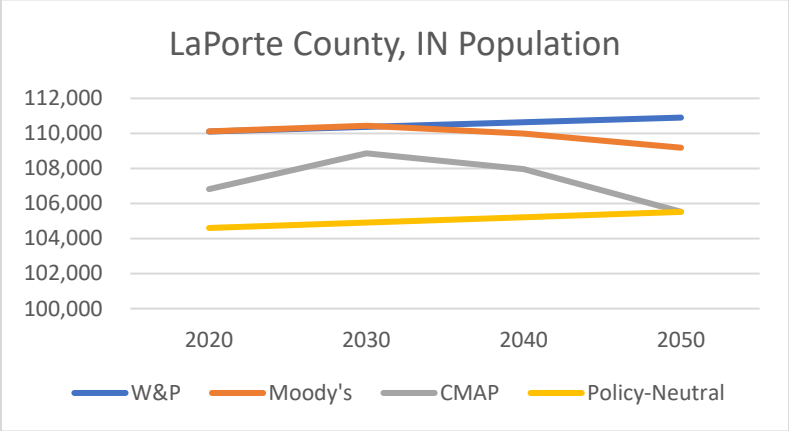


Figure 37: Porter County, IN comparison of forecasts and benchmarks

LaPorte County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	110,108	110,373	110,638	110,903
Moody's	110,115	110,437	109,992	109,184
UIUC	-	-	-	-
CMAP[39]	106,823	108,863	107,961	105,528
NIRPC				*109,337*
Policy-Neutral	104,603	104,909	105,214	105,520



Employment	2020	2030	2040	2050
W&P	53,963	55,057	54,710	53,713
Moody's	41,163	42,088	42,996	43,882
UIUC	-	-	-	-
CMAP	40,496	42,992	43,568	45,611
NIRPC				*43,975*
Policy-Neutral	41,306	42,992	44,679	46,365

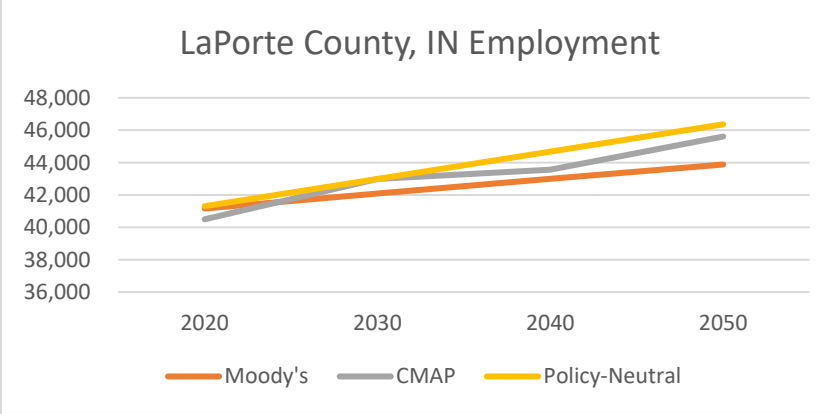
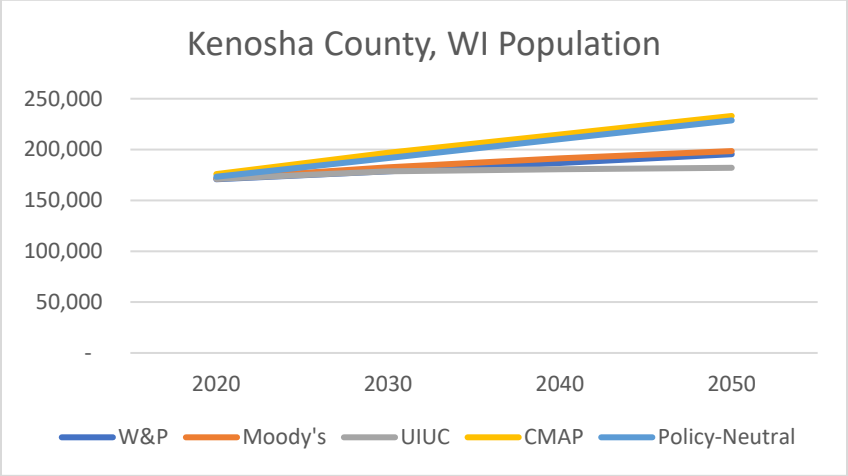


Figure 38: LaPorte County, IN comparison of forecasts and benchmarks

[39] LaPorte County population: Verified with Census: 105k in households, 110k total population. County contains a large prison facility and a university campus. CMAP interim year trajectory suggests that the two population definitions were mixed.

Kenosha County, WI comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	170,807	178,655	186,864	195,449
Moody's	171,474	182,575	191,334	198,512
UIUC	171,195	178,592	180,642	182,089
CMAP	175,896	196,863	214,860	233,035
SEWRPC				*210,000*
Policy-Neutral	173,291	191,754	210,218	228,681



Employment	2020	2030	2040	2050
W&P	90,423	106,502	124,047	143,858
Moody's	69,289	74,483	79,897	85,907
UIUC	73,714	80,459	86,501	93,479
CMAP	73,627	75,814	79,212	82,932
SEWRPC				*90,000*
Policy-Neutral	62,781	69,915	77,049	84,183

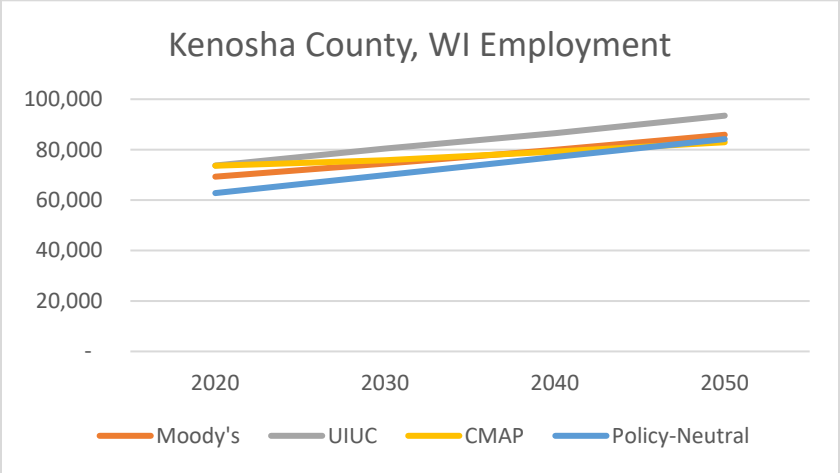
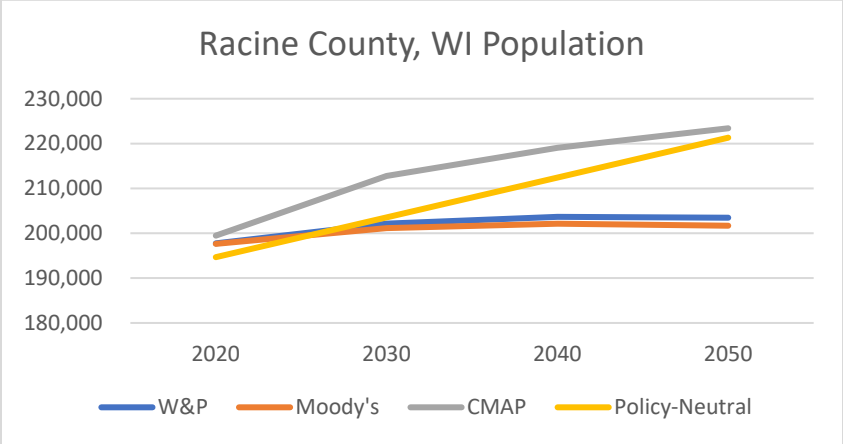


Figure 39: Kenosha County, WI comparison of forecasts and benchmarks

Racine County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	197,748	202,136	203,661	203,463
Moody's	197,639	201,156	202,132	201,698
UIUC	-	-	-	-
CMAP	199,471	212,771	219,065	223,409
SEWRPC				*210,000*
Policy-Neutral	194,670	203,551	212,433	221,314



Employment	2020	2030	2040	2050
W&P	97,899	103,502	106,760	108,598
Moody's	80,068	83,735	87,681	91,708
UIUC	-	-	-	-
CMAP	82,809	85,259	89,091	93,273
SEWRPC				*100,000*
Policy-Neutral	76,670	82,548	88,426	94,304

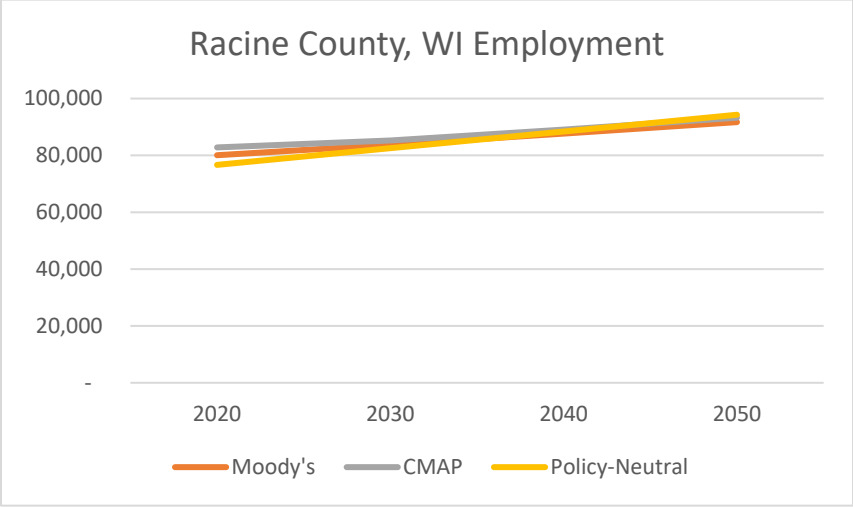
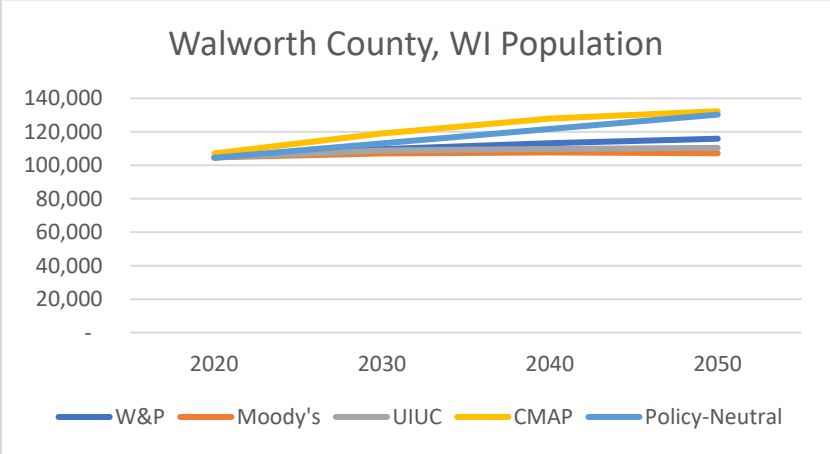


Figure 40: Racine County, WI comparison of forecasts and benchmarks

Walworth County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	104,723	109,677	113,220	115,888
Moody's	104,736	107,045	107,681	107,179
UIUC	104,691	108,843	109,789	110,419
CMAP	107,109	119,060	127,904	132,327
SEWRPC				*125,000*
Policy-Neutral	104,515	113,110	121,705	130,300



Employment	2020	2030	2040	2050
W&P	60,281	65,302	69,268	73,036
Moody's	46,057	48,215	50,375	52,583
UIUC	45,366	50,331	55,114	60,438
CMAP	46,893	48,276	50,450	52,811
SEWRPC				*62,000*
Policy-Neutral	41,979	45,814	49,649	53,484

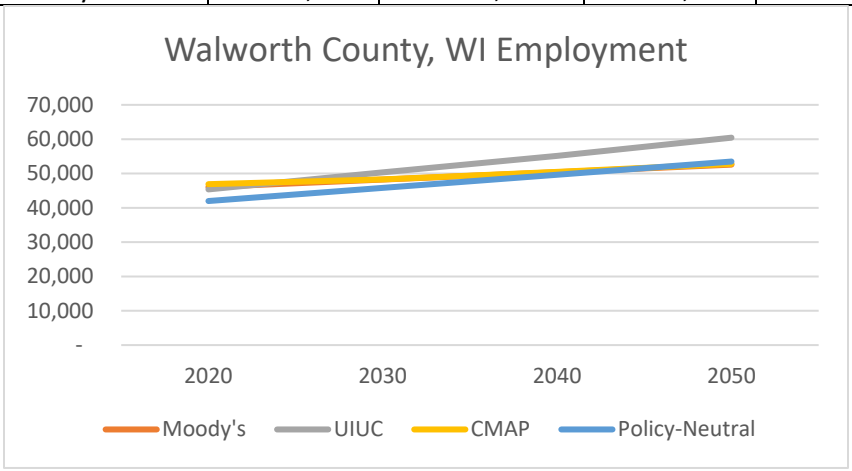
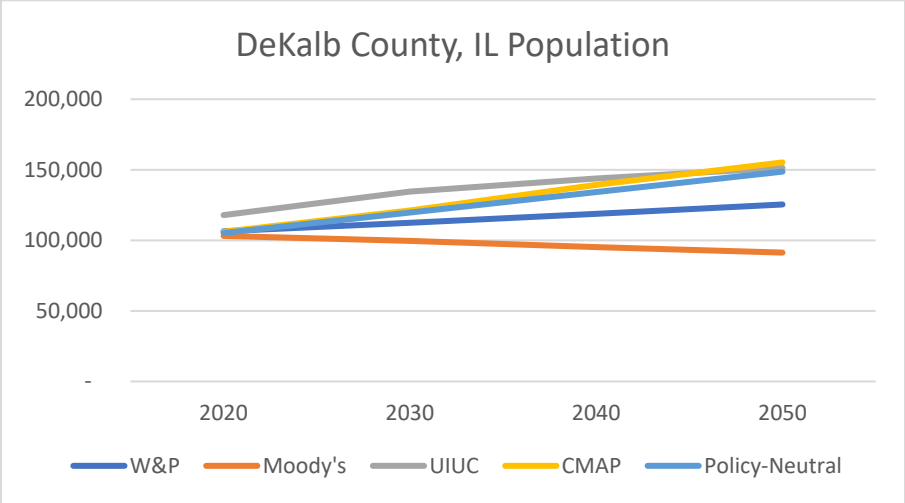


Figure 41: Walworth County, WI comparison of forecasts and benchmarks

DeKalb County comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	106,464	112,441	118,754	125,422
Moody's	103,142	99,651	95,194	91,327
UIUC	117,885	134,562	143,814	151,359
CMAP	106,110	121,202	139,367	155,223
Policy-Neutral	105,229	119,714	134,199	148,685



Employment	2020	2030	2040	2050
W&P	54,822	60,170	64,447	68,384
Moody's	41,631	43,253	44,265	45,584
UIUC	42,427	46,862	50,638	54,947
CMAP	37,453	38,558	40,292	42,183
Policy-Neutral	38,045	39,618	41,191	42,763

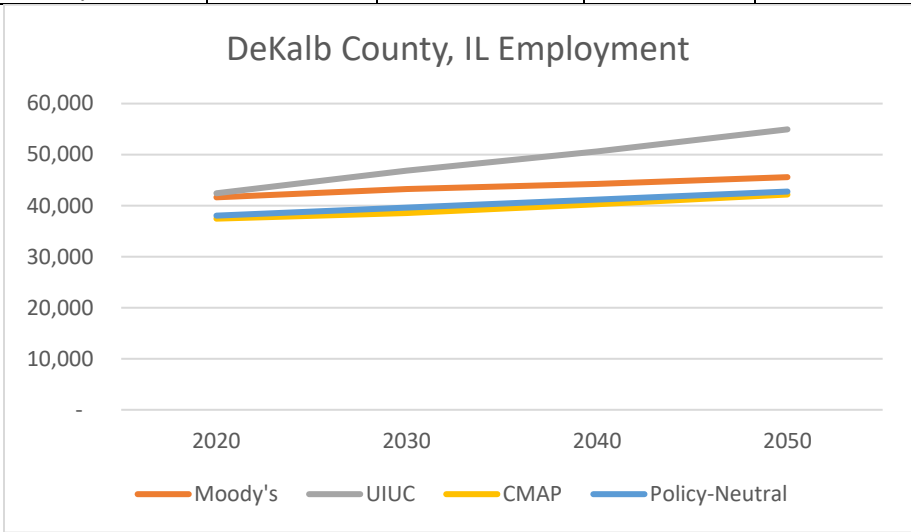
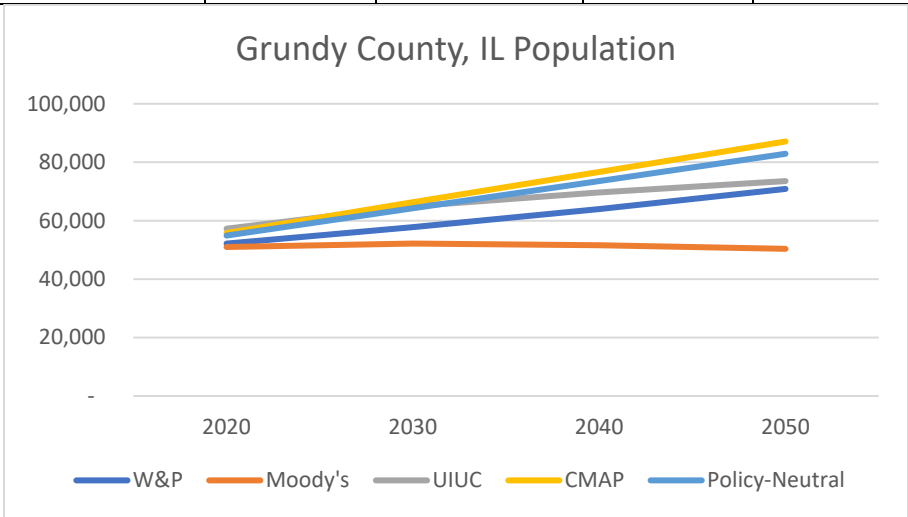


Figure 42: DeKalb County, IL comparison of forecasts and benchmarks

Grundy County, IL comparison of forecasts and benchmarks

Population	2020	2030	2040	2050
W&P	52,160	57,770	63,984	70,866
Moody's	51,008	52,172	51,591	50,367
UIUC	57,263	64,960	69,688	73,549
CMAP	55,795	66,313	76,663	87,099
Policy-Neutral	54,914	64,239	73,564	82,890



Employment	2020	2030	2040	2050
W&P	26,381	30,053	33,517	37,012
Moody's	20,914	22,617	23,992	25,438
UIUC	21,232	23,299	25,042	27,059
CMAP	19,475	20,057	20,957	21,936
				-
Policy-Neutral	19,160	20,215	21,270	22,325

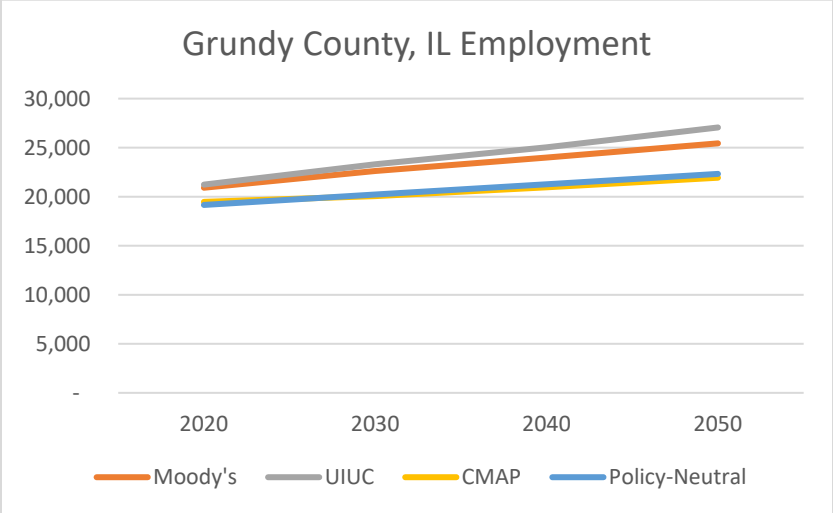
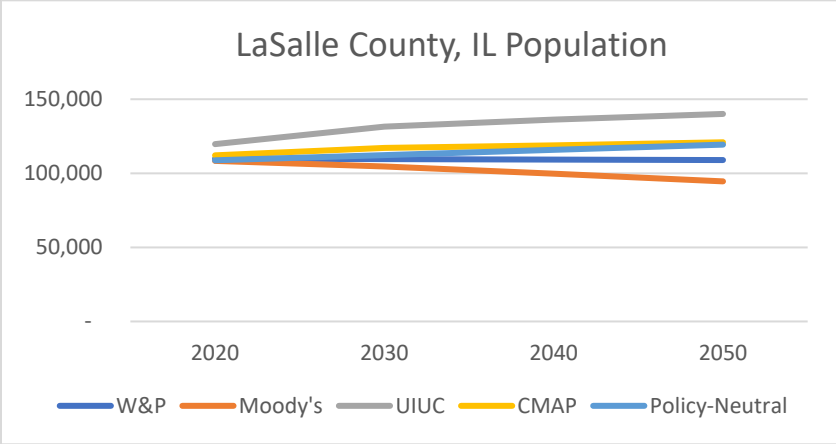


Figure 43: Grundy County, IL comparison of forecasts and benchmarks

LaSalle County comparison of forecasts and benchmarks[40]

Population	2020	2030	2040	2050
W&P	109,965	109,624	109,285	108,947
Moody's	108,376	104,630	99,751	94,558
UIUC	119,709	131,481	136,268	140,077
CMAP	112,134	117,180	118,905	120,941
Policy-Neutral	108,789	112,310	115,831	119,352



Employment	2020	2030	2040	2050
W&P	56,590	57,909	57,762	56,948
Moody's	47,069	48,078	49,206	50,653
UIUC	49,758	55,065	59,765	65,075
CMAP	39,712	40,895	42,720	44,728
Policy-Neutral	43,622	44,042	44,463	44,883

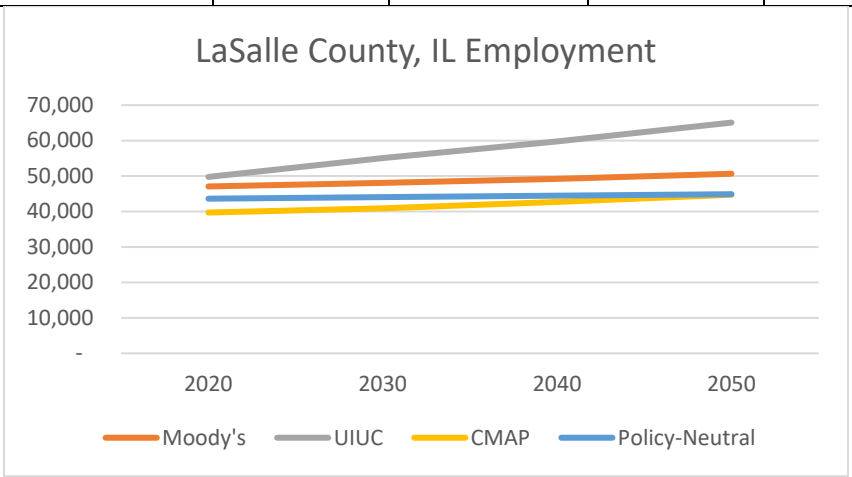


Figure 44: LaSalle County, IL comparison of forecasts and benchmarks

[40] A small portion of rural LaSalle County is not included in the CMAP and Policy-Neutral forecast values. Other benchmarks cover the full county.

Appendix F. Subzone-level forecast dataset

Figure 45 is a list of variables included in the Policy-Neutral forecast dataset file, *<date>_finaloutput.csv*, that accompanies this report. The file contains one row for each subzone17 numbered consecutively 1 through 17418. Including the header record, there are 17419 rows in the file. Subzone17 and Zone17 boundaries are coterminous, i.e. there is a concise many-to-one relationship between their i.d. labels with no overlap or splitting.

Alphabetic List of Variables and Attributes			
#	Variable	Type	Label
4	cmap	Num	CMAP region=1
5	county	Char	County name
9	emp15	Num	2015 Employment
11	emp20	Num	2020 CMAP Employment
13	emp30	Num	2030 CMAP Employment
15	emp40	Num	2040 CMAP Employment
17	emp50	Num	2050 CMAP Employment
1	fips	Num	County FIPS
8	hh15	Num	2015 Households
10	hh20	Num	2020 CMAP Households
12	hh30	Num	2030 CMAP Households
14	hh40	Num	2040 CMAP Households
16	hh50	Num	2050 CMAP Households
29	nemp20	Num	2020 Policy Neutral Employment
28	nemp30	Num	2030 Policy Neutral Employment
27	nemp40	Num	2040 Policy Neutral Employment
26	nemp50	Num	2050 Policy Neutral Employment
24	nhh20	Num	2020 Policy Neutral Households
22	nhh30	Num	2030 Policy Neutral Households
20	nhh40	Num	2040 Policy Neutral Households
18	nhh50	Num	2050 Policy Neutral Households
25	nphh20	Num	2020 Policy Neutral Population
23	nphh30	Num	2030 Policy Neutral Population
21	nphh40	Num	2040 Policy Neutral Population
19	nphh50	Num	2050 Policy Neutral Population
30	phh15	Num	2015 Population
31	phh20	Num	2020 CMAP Population
32	phh30	Num	2030 CMAP Population
33	phh40	Num	2040 CMAP Population
34	phh50	Num	2050 CMAP Population
7	sqmi	Num	total square miles
2	state	Char	State
6	subzone17	Num	CMAP subzone17 id
3	zone17	Num	CMAP zone17 id

Figure 45: Forecast dataset variable listing

Prepared by

CDM Smith®

cdmsmith.com