TASK 3: CORRIDOR REVIEW - CURRENT AND PLANNED

This component of the ABC Ramps Research reviews and evaluates all corridors leading to the ABC Ramps in downtown Minneapolis, including but not limited to I-394, to address the following questions:

1. Are all major routes entering downtown, not just I-394 and I-94 southbound, experiencing congestion, and how much is due to single-occupancy vehicles (SOVs)?
2. If people now approach the ABC Ramps from all directions, would congestion in the core be decreased if more of these people were encouraged to carpool?
3. If all drivers, not just those approaching from the west and north, were eligible to receive incentives to carpool, how would this impact congestion on the city streets? Would congestion be lessened on downtown streets leading to the ABC Ramps?

Minnesota’s roadways are classified according to their function, with some roads designed primarily to carry longer-distance trips at higher speeds. Principal arterials include the interstate highway system, while minor arterials support the interstates. Together, these roadways make up the Federal-Aid Highway System for the seven-county Minneapolis-Saint Paul region. Of the region’s 7,500 miles of roadways, principal and minor arterials comprise only 15% of the network but carry most, about 75%, of its vehicle traffic. Given that the ABC Ramps were developed as part of the I-394 transportation system, the principal arterials and their supporting minor arterial roads are the focus of this section.

Several sources were used to review and evaluate all corridors leading to the ABC Ramps, including regional population and transportation infrastructure forecasts from the Metropolitan Council, MnPASS and corridor volume data from the Minnesota Department of Transportation (MnDOT), vehicle characteristic data obtained through SRF Consulting, in Saint Paul, and a carpool audit study conducted by Kimley-Horn, also based in Saint Paul. Graduate research assistants under the supervision of Adeel Lari and Frank Douma synthesized the data from these sources.

CARPOOL STUDY

In October 2016, Kimley-Horn placed staff at all eight entrances to the three ABC Ramps to collect data on carpool vehicles and SOVs entering the ramps and eventually to evaluate the characteristics of carpool commuters. Each entrance to the ABC Ramps has dedicated lanes for carpools and SOVs. Ramp A has three gated entrances, one from I-394 and two from city streets. Ramp B has two gated entrances, one from I-394 and one from city streets, and Ramp C has three gated entrances, one from a city street diverted from southbound I-94 and the other two from city streets (Figure 1).
During the periods monitored, Ramp A, which is twice as large as the other two ramps, approached 46% capacity by 9:30 a.m. By comparison, Ramp B and Ramp C reached 84% and 78% capacity, respectively, by 9:30 a.m. These findings were largely consistent with MnDOT’s evaluations of the three ABC Ramps. Ramp A’s proximity to Target Center, Target Field, and the entertainment venues on Hennepin Avenue attracts a higher proportion of event parking, while Ramp B and Ramp C absorb much of the commuter and residential traffic in the Warehouse District, also called the North Loop, during peak demand hours.

To encourage more people to choose Ramp A, the parking rates for Ramp A are slightly lower than those at the other two ramps, with regular SOV contracts available for $130 per month. Carpool contracts are offered at a discount rate of $20 a month for drivers entering the three ramps from I-394 and I-94, with standard carpool contracts for commuters from other parts of the metro priced at $99 per month. Very few people utilize this latter option; nearly 98% of all carpool contracts are of the $20 variety (Table 1). Contract holders use transponder cards to open the gates, which are also monitored for carpool adherence between 6 a.m. and 9:30 a.m. on weekdays.
Table 1 ABC Ramp Contract Distribution

<table>
<thead>
<tr>
<th>Ramp</th>
<th>Total Spaces</th>
<th>Total Contracts</th>
<th>SOV Contracts</th>
<th>$99 HOV Contracts</th>
<th>$20 HOV Contracts</th>
<th>Total Carpool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramp A</td>
<td>3,518</td>
<td>1,425</td>
<td>992</td>
<td>3</td>
<td>430</td>
<td>433</td>
</tr>
<tr>
<td>Ramp B</td>
<td>1,573</td>
<td>1,266</td>
<td>1,010</td>
<td>14</td>
<td>242</td>
<td>256</td>
</tr>
<tr>
<td>Ramp C</td>
<td>1,493</td>
<td>1,107</td>
<td>1,026</td>
<td>1</td>
<td>80</td>
<td>81</td>
</tr>
</tbody>
</table>

The Kimley-Horn study also found that most of the carpools entering the ABC Ramps were composed of two adults, with youth passengers accounting for anywhere between 1% and 6% of carpool partners. The fact that relatively few carpools contained only youth passengers is positive; the intent of the program was for carpools to replace individual vehicle trips. However, most carpools involved just one passenger; only 3% to 5% of vehicles contained more than one passenger across the three ABC Ramps (Figure 2). By comparison, two-person carpools make up 77% of all carpool trips in the Twin Cities region and 80% of all carpool trips nationally.

Figure 2 Average Carpool Occupancy

Between 22% and 47% of carpools with ABC Ramp contracts were unaccounted for (did not arrive) during the average weekday morning audit period, meaning these carpools either entered an ABC Ramp during off-peak hours or did not use the ramps on any given day. Another notable finding of the study was that anywhere between 10% and 25% of carpools—on average about 66 vehicles a day—entered the ramps through the general lanes, meaning they paid the hourly or SOV contract rate despite having a driver and at least one passenger. While these vehicles could be infrequent ramp users or infrequent carpoolers, they represent a group of users who could be rewarded with some type of carpool discount, either through the traditional monthly discount or through a daily carpool rate. The largest number of
these two-person carpools, as well as overall trips, arrived from I-394 or Second Avenue through Gate 1 at Ramp B. Gate 3 at Ramp A, with its entrance connecting directly to I-394, had the most vehicles entering through carpool lanes (Figure 3).

Carpool Entries by Type of Lane

\[\text{Figure 3 Carpool Entry by Lane}\]

Also surprising is the number of carpools entering the ABC Ramps from surface streets. Almost 98% of all carpool contracts are of the heavily discounted $20 variety, meaning they demonstrated to Move Minneapolis (which sells the discounted passes) that their shortest commute to downtown was from either I-394 or I-94. But 170 carpool vehicles a day—almost 50% of carpoolers—entered the ramps through a street-level entrance, compared to only 18 vehicles with registered $99 carpool contracts. Thus, it appears that about half of the $20 contract holders are exiting I-394 or I-94 before arriving at one of the ABC Ramps and traveling through local downtown streets—presumably via 10th Street or Seventh Street at Ramp A and Fifth Street or Second Avenue at Ramp B and Ramp C. This finding is significant in that it shows many carpoolers are currently using the city streets to enter the ramps. Expanding the carpool contract to corridors other than I-394 and westbound I-94 may not have much impact on congestion on the city streets.

**TRAFFIC GROWTH**

MnDOT’s latest *Metropolitan Freeway System Congestion* report shows that the total miles of congestion in the Twin Cities metro region increased from 260 miles in 2006 to nearly 360 in 2016. MnDOT defines congestion as traffic flowing at speeds less than or equal to 45 mph. Roads with severe congestion saw their change in congested miles increase 50% over 2006 levels (Figure 4).
In the absence of segment-level congestion data, annual average daily traffic (AADT) data can be used as a proximity measure to understand where this congestion occurs. Average daily vehicle counts used to obtain the AADT are estimated through pavement-embedded sensors throughout the state.

**I-394/Trunk Highway 12 (TH12):** Traffic volume on I-394 has varied, with portions of the roadway recording traffic volume as low as 83% of 1998 volume and as high 160%. Traffic estimates in 2015 ranged from 29,000 vehicles per day to 126,000 vehicles per day.\(^1\) Spatially, volume decreased in the western end near the I-494 interchange and increased in Minneapolis near the Hawthorne distributor in downtown—commonly the most congested segment of I-394. Overall, the corridor is slightly more congested than it was 10 years ago, with an estimated 7.5 miles of morning congestion in 2015 compared to 6.5 miles in 2006.\(^2\) The heaviest congestion occurred between Highway 100 and I-94 near the downtown exits and before the Lowry Avenue tunnel.\(^3\)

---

1 MnDOT (2016) AADT
3 Metropolitan Council Highway Transitway Corridor Study Technical Memorandum 1, May 2014
I-35W: Depending on the segment of the freeway, I-35W demonstrated traffic volume in 2006 that was as low as 71% and as high as 148% of its 1998 volume. In 2015, the daily traffic estimates ranged from 42,000 vehicles a day in the north metro to as high as 221,000 vehicles a day near downtown. Traffic volume increased in the far northern and southern segments; however, a noticeable increase in AADT also occurred around the downtown core, connecting to I-94 from the south and near the Washington Avenue and University Avenue crossings (Figure 5). Overall, the corridor is slightly more congested than it was 10 years ago, with an estimated 28 miles of morning congestion in 2015 compared to 27 miles in 2006. This congestion occurs along most of the interstate’s length through Minneapolis, stretching from I-494 in the south to County Road 36 in the north.

![Regional Arterial Traffic Volume Growth, 1998 - 2016](image)

Figure 5 Corridor Volume Change, 1998–2016

I-94: In 2016, traffic volume on I-94 was as low as 77% of 1998 volume on sections of the freeway but as high as 200% on other segments. Counts along the corridor in the last comprehensive assessment were as high as 179,000 daily vehicles south of downtown Minneapolis. The volume increase occurred in the exurban and rural segments, while traffic volume leading through urban centers stayed flat or decreased. Overall, the corridor is slightly less congested than it was 10 years ago, with an estimated 25 miles of morning congestion in 2015 compared to 26 miles in 2006. Last year’s estimates show that the AADT count was 17,800 at the last counter before entering downtown streets from southbound I-94.4

---

4 MnDOT AADT (2016)
Congestion on I-94 again mostly occurs closest to the downtown Minneapolis exits, stretching from TH280 to the east to TH55 to the west.

**Trunk Highway 55 (TH55):** In 2016, traffic volume on sections of TH55 was as low as 71% and as high as 250% of 1998 volume, particularly in Southeast Minneapolis and Bloomington along Hiawatha Avenue. Counts in 2015 ranged from 840 daily vehicles in the rural segment to 74,000 daily vehicles near the Minneapolis-Saint Paul International Airport (Figure 6).

![Regional Arterial Traffic Volume Growth, 1998 - 2016](Image)

**Figure 6 Corridor Volume Change, 1998–2016**

Ultimately, segments of increased traffic seem to occur largely in the outer suburban areas of the seven-county metro region, as well as in urban segments leading to or passing near downtown Minneapolis.\(^5\) This matches the general population trend of the last 20 years. Having grown to 3.1 million residents in 2016, up from 2.8 million in 2010, the Twin Cities is the 16th largest metropolitan region in the country but ranks 42nd in terms of population density. The Twin Cities has long been more suburban and sprawled-out than most other metro areas with similar populations. This can be seen in the spread of low-density population development to the outer edges of the metro-area highway infrastructure (Figure 7).

\(^5\) MnDOT AADT (2016)
In 2016, the consulting firm SRF ran an analysis through a dataset called INRIX, sampling trips ending at three defined boundaries near the ABC Ramps in the fall months of 2015. The first study area was defined by the physical boundaries of the ABC Ramps. The second area (B1) was defined as one to two blocks away, with the third area (B2) defined as two to three blocks away. Nearly 107,000 trips were queried to the second buffer zone representing much of downtown and the North Loop, 28,000 to buffer one, and about 4,800 to the ABC Ramps themselves. The GPS points for these trips were plotted and assigned to the major corridors leading into and out of downtown. They were then scaled using AADT values collected by MnDOT. For this analysis, the geography surrounding B1 was selected as a compromise measure, serving as specific enough to capture many trips ending near or at the ABC Ramps while leaving a sample size large enough to minimize error and a geography wide enough to account for spatial inaccuracy in GPS points (Figure 8).
Of the 72,000 INRIX trips reported on a given day into the downtown area, the highest proportion of traffic converged on I-394 or I-94 coming from the north or west. When incoming trips were analyzed by general direction, eastbound traffic from I-394 and TH55 ultimately carried the most vehicles into all three geographies, followed by southbound traffic on I-94 and inbound traffic on I-35W. This finding illustrates either the effect of the ABC Ramps program or the basis for the program’s focus being on the west and north metros (Table 2).

Table 2 Traffic by Corridor

<table>
<thead>
<tr>
<th>Mode</th>
<th>I-394</th>
<th>TH 55 SB</th>
<th>I-94 WB</th>
<th>I-35W SB</th>
<th>I-94 EB</th>
<th>I-35W NB</th>
<th>TH 55 NB</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffer 2 Inbound</td>
<td>17%</td>
<td>4%</td>
<td>9%</td>
<td>6%</td>
<td>10%</td>
<td>12%</td>
<td>2%</td>
<td>40%</td>
</tr>
<tr>
<td>Buffer 1 Inbound</td>
<td>15%</td>
<td>3%</td>
<td>8%</td>
<td>5%</td>
<td>14%</td>
<td>9%</td>
<td>1%</td>
<td>45%</td>
</tr>
<tr>
<td>ABC Inbound</td>
<td>18%</td>
<td>3%</td>
<td>8%</td>
<td>8%</td>
<td>10%</td>
<td>8%</td>
<td>0%</td>
<td>45%</td>
</tr>
</tbody>
</table>

When linked to zip codes with the highest proportion of originating INRIX trips, the geographic spread becomes slightly clearer. While trips ending near the ramps seem to arrive from I-94 southbound, many of these trips originate in the northwest metro, anywhere from 13 to 14 miles away. Trips arriving from
the south extended well into Dakota and Scott counties, with the longest average distance being 18 miles away from the ABC Ramps. Trips arriving on I-35W from the north and I-94 from the east were comparatively shorter, clearly pointing to trips originating in the suburbs of Roseville and Woodbury (Figure 9).

The INRIX data shows arrivals to each zone on weekdays generally occur within 45 minutes of 8 a.m. and 6 p.m. The larger morning peak represents commuters who work downtown, while the smaller evening peak represents reverse commuters, evening workers, and those traveling to the city for entertainment. Departure from downtown on weekdays and weekends occurs within 45 minutes of 6 p.m. and 10 p.m., representing the work and entertainment crowds, respectively. Among overall traffic, 30% arrives during the morning peak hours, 36% during the evening peak hours, and 33% during off-peak hours. Transportation trends are generally more muted on weekends, when arrivals are spread over the course of the day, with small peaks occurring toward the early afternoon and early evening. Departures and arrivals generally follow the same trend (Figure 10).
Figure 10 INRIX Weekday Arrival and Departure

FUTURE INFRASTRUCTURE AND POPULATION CHANGE

Whether this trend continues will depend on long-term and near-term changes that could impact the ABC Ramps. Longer term, several transportation projects in the region could impact traffic on the highway corridors leading to the ABC Ramps. (Transit projects were estimated from existing revenue forecasts in the Metropolitan Council’s 2040 Transportation Policy Plan.) Shorter-term impacts are described in the Minnesota State Highway Investment Plan 2018-2037, including the following upcoming construction highlights.

I-35W:
• The final phases of reconstructing I35W from I-94 to TH 62

• Reconstruction of the bridge over the Minnesota River between Bloomington and Burnsville will contribute to bridge safety but will also likely increase congestion for the duration of the project, expected to stretch into 2021.6

• Repaving and signal upgrades from University Avenue SE to County Road 36 are expected to be completed by the end of 2018.7

I-94:

• Lane additions from TH610 to TH101 are slated for completion in summer 2018, and resurfacing between Nicollet Avenue and Brooklyn Center, as well as bridge, tunnel, and exit ramp repairs are also planned.8

• The Rethinking I-94 study will establish plans for MnPASS expansion and other efforts.

TH55:

• Resigning along TH62 and TH55 to be started and completed in summer 2018.9

• Curb and guardrail replacements along TH55 between Rockford and Minneapolis will cause lane closures for the duration of the project during, expected to last through summer 2018.10

Studies of the impact of light rail transit (LRT) investments on congestion mitigation vary widely, but recent estimates from other metropolitan regions show these projects can absorb as much as 10% of


new traffic on highways within the vicinity of the LRT.\textsuperscript{11} The region’s two planned light rail extension projects will extend the existing Blue and Green lines into the northwest and southwest suburbs, respectively. Both extensions fall within the general downtown Minneapolis commuter shed, coming from the west.

Metro Transit is also planning several bus rapid transit (BRT) and arterial (aBRT) lines. The Red Line, the region’s first BRT, made its debut in 2013, connecting the Mall of America with the suburb of Burnsville. The first aBRT, the A Line, opened in St. Paul in 2016, connecting Minneapolis with the northern suburb of Roseville.\textsuperscript{12}

- The Orange Line is a 17-mile BRT that will largely run along I-35W, connecting Minneapolis, Richfield, Bloomington, and Burnsville. Construction of some project elements is underway and the project is expected to open in 2020.

- The C Line, an aBRT, will run primarily along Penn Avenue in Minneapolis and is expected to open in 2019.\textsuperscript{13}

- Construction on the D Line, extending along Fremont Avenue to the north of downtown and Chicago Avenue to the south, is expected to begin in 2021.

MnPASS has grown from being offered only on I-394 in 2005 to now also being offered on I-35W and I-35E. Current expansion efforts will focus on filling in gaps on I-35W, both on segments in South Minneapolis and on the segment connecting downtown Minneapolis to Roseville.

- On I-35W, lanes will be added from 46th Street to 26th Street. The project will include a new transit facility to support local transit, and the new Orange Line BRT will be completed by 2021.

- MnPASS lanes will be added between County Road C and County Road 17 in Blaine.\textsuperscript{14}

These transportation projects will generally track projected population and employment growth in the region. Metropolitan Council estimates that through 2030 there will be a continuation of suburban and


\textsuperscript{12} Metro Transit. \textit{ABRT Study}. Retrieved from: https://www.metrotransit.org/abrt-study


\textsuperscript{14} MnDOT. MnPASS. Retrieved from: http://www.dot.state.mn.us/mnpass/mnpassdocuments.html
exurban development through the dispersion of low- and medium-density transportation analysis zones (TAZs). By 2030, the western and northwestern counties are projected to have 2 million residents compared to 1.6 million for the southern and eastern counties. While employment centers will continue to move outward to the suburbs, primarily along transit or freeway corridors, Minneapolis is projected to retain its status as the primary employment hub of the region, representing 15% of all jobs in Hennepin County by 2030. Projected job density in downtown will remain much higher than in the region, with an average of 103,000 jobs per square mile in downtown Minneapolis, for instance, compared with only 10 jobs per square mile for all of Hennepin County. Much of the growth in job density will occur within the downtown area, with a cumulative increase of 366,000 jobs by 2030, compared to 866,000 for the county. Thus, for the foreseeable future, there will be commuters traveling to downtown Minneapolis (Figure 11).
Figure 11 Employment Change 2014–2030
CONCLUSION

Congestion leading to downtown Minneapolis has grown over the past two decades. Compared to 1998 volumes, congestion on portions of I-394 has increased by much as 60%; on I-35W by as much as 40%; on I-94 by as much as 100%; and on TH55 by as much as 150%. The Minneapolis-St. Paul region is projected to gain 545,000 new residents by 2030. At current rates of vehicle ownership, population growth could mean as many as 475,000 new cars on the road by 2030.\textsuperscript{15} Much of this growth will occur in suburban areas whose residents commute to downtown Minneapolis. Thus, traffic volumes along corridors leading to the ABC Ramps are expected to continue to increase, and the ABC Ramps should look for new ways to mitigate the impacts of this additional traffic on downtown congestion.

The ABC Ramps are successfully capturing the traffic from I-394 to the west and I-94 to the north that they were designed to serve—just over half of traffic to the ABC Ramps arrives along these corridors, which, as noted above, are among the fastest growing in the region. However, the remaining user base of the ABC Ramps comes from areas that do not qualify for reduced prices for carpool parking, such as areas to the northeast, east and south of downtown. Offering the discounted carpool rate to carpools from across the entire Twin Cities region and other programs to reduce SOV travel could help the ABC Ramps better achieve its objective to reduce congestion on the interstate system, particularly I-394. Discounted carpool parking prices and flexible parking-transit products could entice some SOV drivers coming from the northeast, east, and south metro to carpool, therefore reducing congestion on downtown streets.