EXECUTIVE SUMMARY

A. PROJECT IDENTIFICATION			
Project Title:	Tri-State Tollway, Roadway Study, 95th Street (MP 17.5) to Balmoral Avenue (MP 40.0)		
Project Number:	RR-14-4221, RR-14-4222, RR-14-4223, RR-14-4224		
Design and Construction Cost:	$ 3,667,000,000	**Design Start:**	2017
Right of Way Cost:	$ 184,000,000	**Construction Start:**	2018
Utility Relocation Cost:	$ 149,000,000		
Total Cost: (Midpoint of Expenditure)	$ 4,000,000,000		
Sponsor Dept.:	Engineering	**Date Prepared:**	December 22, 2017

B. PROJECT DESCRIPTION

1. Project Location

The project limits for the Central Tri-State Tollway (CTST) Master Plan are from 95th Street (milepost 17.5) in the Village of Bridgeview to Balmoral Avenue (milepost 40.0) in the Village of Rosemont, as shown in Figure 1. For the purposes of this Master Plan study, there is an omission within the project limits, between North Avenue (milepost 33.6) to just south of Wolf Road (milepost 36.3). Improvements within this section are to be implemented by Illinois Tollway Contract I-15-4656, IL Route 390 / I-490 (Elgin O'Hare Western Access Project) funded by the CTST budget, and are fully coordinated with the CTST project.

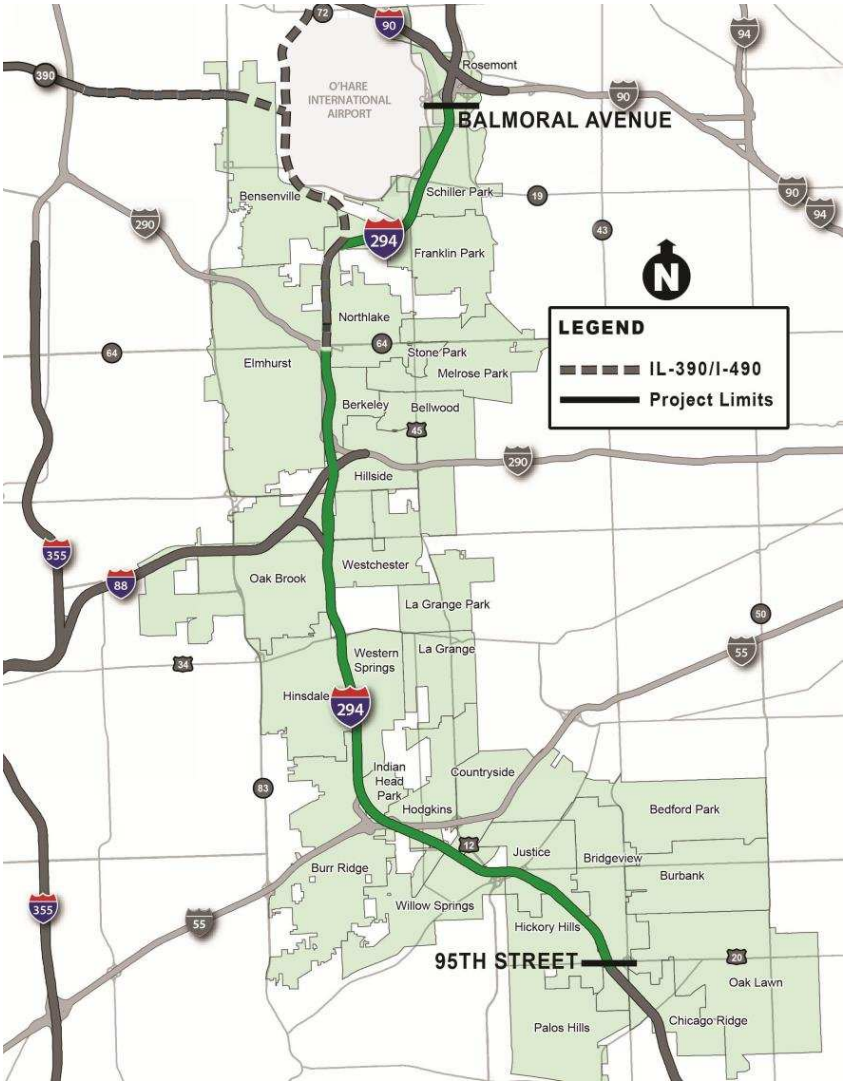


Figure 1: Location Map, Central Tri-State Tollway Study Limits

The overall Tri-State Tollway, from the state borders of Indiana to Wisconsin, is the backbone and workhorse of the Illinois Tollway system. At the heart of the Tri-State is the

Central Tri-State Tollway (CTST) (I-294) from 95th Street to Balmoral Avenue, which is the focus of this Master Plan. This 22-mile section of the Tri-State carries some of the heaviest volumes of passenger and freight traffic on the Illinois Tollway system.[1] Due to insufficient capacity as well as operational deficiencies, the CTST regularly experiences twice the amount of congestion and delay when compared to the entire Illinois Tollway system. These delays are estimated to cost drivers $330 million annually in time and fuel. The CTST also plays an integral role in the region's economy. The roadway is central to the region's transportation network connecting two major international airports, three railroad intermodal facilities, thousands of businesses and hundreds of thousands of residents and workers. This project is intended to bring the CTST to a state of good repair and to replace an outdated, frequently congested roadway with a modern, 21st Century corridor that better serves the region's transportation network and allows customers to travel more safely, reliably and efficiently.

2. Purpose/Objectives of the Master Plan

In 2011, the Illinois State Toll Highway Authority (Tollway) Board of Directors approved a 15-year, $12 billion capital program called *Move Illinois: The Illinois Tollway Driving the Future*. The capital program will improve mobility, relieve congestion, reduce pollution, create jobs and link economies throughout the region. The original *Move Illinois* Program included $1.9 billion to replace the CTST aging pavement and to bring the roadway, bridges and ramps into good repair. After further internal Tollway review of the corridor, the Tollway determined that the CTST is too vital to the Tollway system and to the Chicago region to simply reconstruct in-kind. Reconstructing the roadway and disrupting traffic for multiple years without making any additional improvements would be short-sighted and leave this critical segment of the Tollway system incapable of accommodating current and future travel needs.

Understanding the need for external stakeholder input and a thorough evaluation of long-term improvement options, the Tollway Board of Directors authorized that a Master Plan be conducted to support future decision making and to carve out a regional long-term plan for the corridor. While the Master Plan serves as an internal document for the Tollway, the cornerstone to the overall evaluation is input from external stakeholders.

Central to ensuring that the Master Plan was reflective of the region's long-term needs was the establishment of a Corridor Planning Council (CPC) to guide decision making for the CTST corridor. The CPC consisted of regional stakeholders including the region's transportation agencies, local business association leaders, representatives from the commercial freight industry, and appointed representatives from the DuPage Mayors and Managers Conference, Northwest Municipal Conference, South Suburban Mayors and Managers Association, Southwest Conference of Mayors, and the West Central Municipal Conference. CPC members established a vision for the corridor by developing guiding principles for the Master Plan, prioritizing corridor issues and identifying recommendations to inform ongoing planning.

[1] CDM Smith (2016). *Illinois Tollway Comprehensive Study Update.*

The CPC guiding principles support innovative, sustainable, and financially prudent solutions to improve the overall travel reliability and performance of the roadway for all users. Priority issues identified by CPC members were congestion, access, flooding/drainage, and freight mobility/safety.

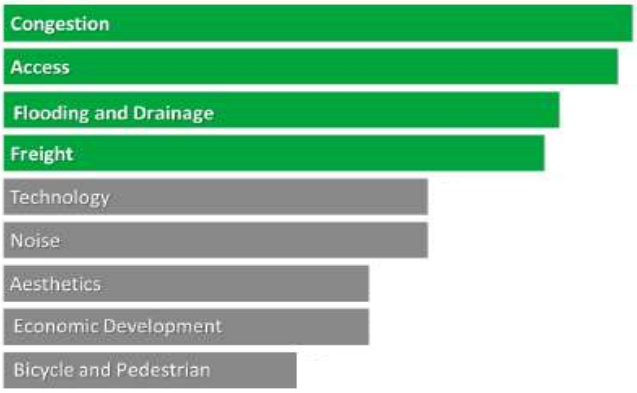


Figure 2: Corridor Planning Council, Listing of Priorities

Beyond the identified priority issues, the CPC created a set of recommendations to provide guidance for:

- Improving current and future reliability, mobility, and performance,
- Addressing environmental impacts and support sustainability, and
- Promoting innovation and economic opportunity within the corridor.

Based on the CPC's input, the Master Plan evaluates various alternatives and defines a recommended alternative that best aligns with the established goals and priorities of the region. Once the Recommended Alternative is defined, the Master Plan attempts to identify the widest reasonable footprint to accommodate the recommended improvements. In doing so, the Tollway can better anticipate right-of-way needs, utility relocations, environmental permits and intergovernmental agreements needed for the project.

While the purpose of the Master Plan is to define a Recommended Alternative that optimizes what is in the best interest of the region, as the project moves forward into future Design and Refinement Phases, the project activities will become more locally oriented. As more detailed information becomes available in future Design Phases, the project will better assess and minimize local impacts as well as maximize opportunities for collaboration between Tollway's project and local improvement projects led by municipalities and/or partner agencies. The recommendations in the Master Plan establish the initial concept, a starting point from which the detailed design phases will begin. Additional stakeholder input would then help define and refine the final design plans.

3. Existing Conditions

An early step in the Master Plan process was assessing the existing conditions of the roadway and the corridor. The project team conducted field work, performed inspections, analyzed data and met with

municipal and agency stakeholders along the corridor to identify the existing conditions and needs of the roadway and surrounding corridor.

Facility Condition: The CTST opened in 1958 with two lanes of traffic in each direction from 95th Street to the Stevenson Expressway (I-55) and three lanes in each direction beginning north of I-55 to Balmoral Avenue. Northbound and southbound directions were separated by an open median. Today the CTST generally consists of eight lanes, four in each direction, with auxiliary lanes at system interchanges and toll plazas. The northbound and southbound directions are separated with a concrete median barrier. Within the study area there are existing system interchanges with I-55 and I-290/I-88, a future connection with IL Route 390 / I-490 (Elgin O'Hare Western Access), 9 local interchanges, 2 oases, and 4 mainline toll plazas.

Pavement, bridges, and other infrastructure elements within the project limits vary in age and condition due to the incremental nature in which corridor improvements were made since the opening of the original facility in 1958. Several programs of rehabilitation, widening, and other work were performed in the 1970s, 1990s, and the 2000s. Not all elements were replaced during these programs, and as a result, some pavement, bridges, and other infrastructure date back to the year the CTST opened – 1958. While recent rehabilitation work has extended the remaining life of pavement sections and has improved the riding surface, the continued deterioration of the underlying pavement base is expected to result in rapidly reduced condition and the need for more frequent rehabilitations and overlays. This is not cost effective and would result in repeated disruptions to customers.

Major bridges, such as the Mile Long Bridge (BN 191/192), were constructed in 1958 and have reached the end of their useful life. Life cycle cost analyses suggest that rehabilitation of these structures is not considered a cost-effective long-term solution. Structures like the Mile Long Bridge already require frequent patching and repairs that cause ongoing disruptions to customers. Replacing these structures is not only cost-effective but will improve the customer's commute with a safer, smoother, and more reliable experience.

Congestion and Mobility: The CTST is the most heavily traveled roadway in the 294-mile Tollway system and supports existing daily traffic volumes of up to 213,500 vehicles of which as much as 17% are commercial freight vehicles. This portion of I-294 has not been widened in nearly 25 years and traffic growth over that time means this segment typically experiences the worst congestion and travel delays for customers and commerce than any other part on the Tollway system.

Table 1: Average Daily Traffic Volumes 1980-2014 (Northbound I-294)

Location	Milepost	ADT (1990)	ADT (2014)	Percent Change
83rd St (Toll Plaza 39)	19.5	35,890	71,060	+89%
Cermak Rd (Toll Plaza 35)	29.9	39,360	69,620	+77%
Irving Park Rd (Toll Plaza 33)	38.9	53,050	99,620	+88%

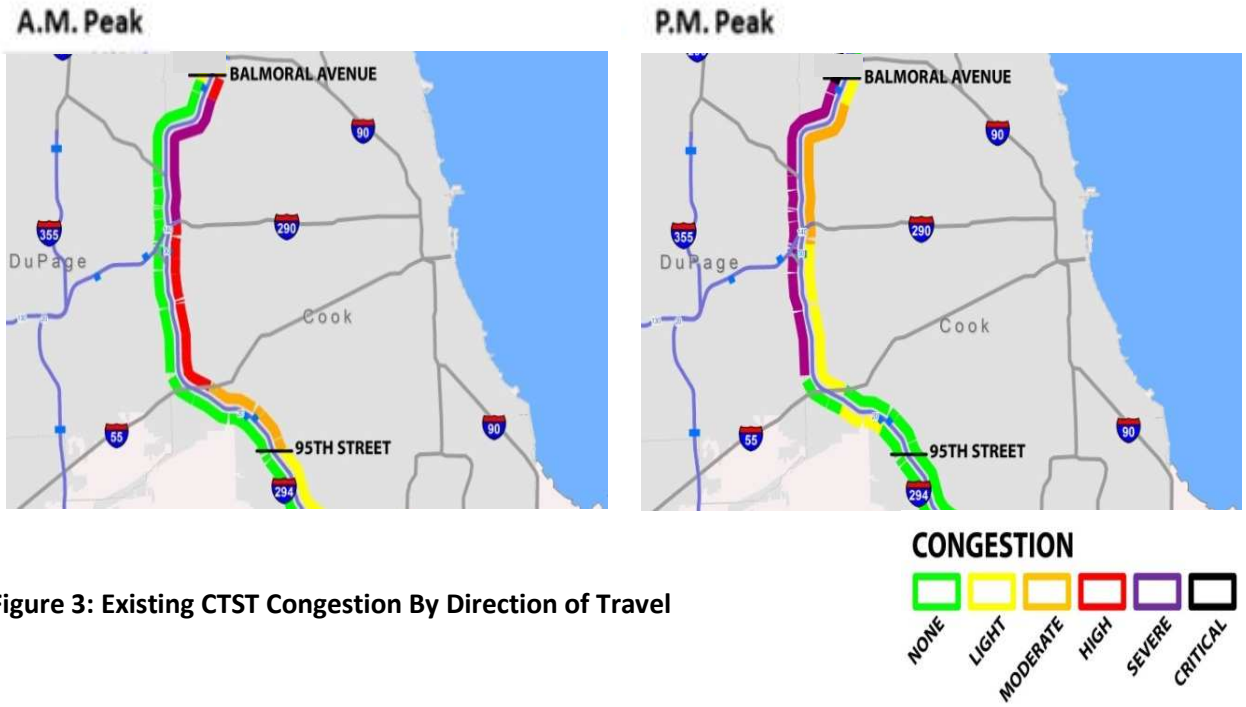


Figure 3: Existing CTST Congestion By Direction of Travel

Over time the corridor has become a destination in its own right. Large industrial, freight and commercial distribution centers, including UPS and FedEx, have located along the CTST to take advantage of the connections it provides to other highways, O'Hare International and Midway Airports, and railroad intermodal facilities. Communities around the CTST have experienced significant growth as it offers not only economic advantages for businesses but also convenient travel opportunities for the region's workforce. As seen in Table 1, average Daily Traffic (ADT) has grown significantly throughout the corridor. This growth, however, has also led to congestion, as depicted in Figure 3. In turn, the increasing congestion has led to traffic diversion off of CTST and onto other routes. As part of the Tollway's Commercial Vehicle Strategic Plan, freight industry feedback revealed that the most commonly avoided segment of the Tollway was the CTST because this segment experiences the most significant congestion and travel time delays on the entire Tollway system. These findings corroborate with observations made by local municipalities that vehicles are diverting off of the CTST to local roads, particularly during peak periods.

Beyond providing additional capacity on the CTST mainline, improving operational problems at key interchanges is also needed to improve traffic flow along the corridor and to reduce the amount of cut-through traffic on local roads in adjacent communities. At major merge points, the demand exceeds available capacity for large portions of the day. Queues at several locations regularly extend for up to three miles, resulting in extensive delays. As part of the existing conditions analysis, major points of reoccurring congestion and delay were identified at:

- Northbound I-294 at I-55 (Hinsdale Oasis)
- Northbound and Southbound I-294 at I-290/I-88 Interchange
- Southbound I-294 at O'Hare Oasis
- Southbound I-294 at I-88 Connector

The existing travel times for a vehicle to travel the length of the corridor (95th Street to Balmoral Avenue) were compared to free-flow conditions during both the a.m. and p.m. peak hours. On a typical basis, travel times are often 30 minutes longer during peak travel times, highlighting existing congestion within the corridor. Congestion extends beyond just the peak periods. Actual travel times exceed free-flow travel times 60% of the time in the a.m. and 71% in the p.m.[2]

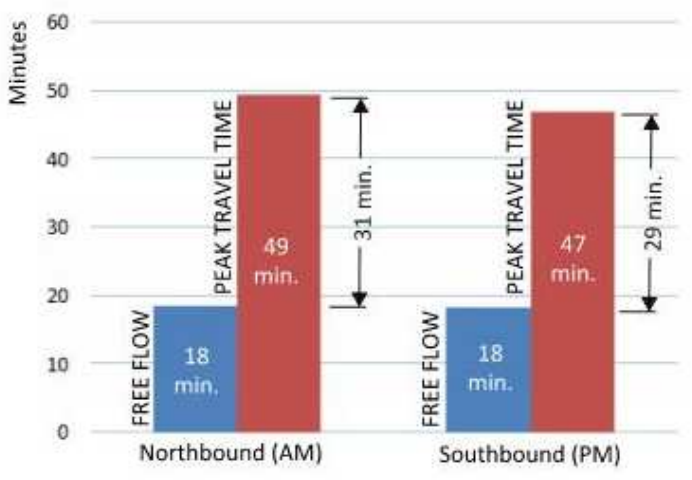


Figure 4: Existing Travel Times, 95th St to Balmoral Ave.

In order to meaningfully address congestion, as prioritized by the region through the CPC, current and future traffic demand requires increased capacity through the corridor. Travel demand models indicate that population growth in the corridor as well as changes in regional travel patterns will increase traffic by 15% in Year 2040. Without adding capacity, the roadway will experience even more congestion in the coming years, increasing traffic diversion onto local roads. Providing the needed number of lanes in each direction, based on the projected traffic volumes, and improving operational problems at key interchanges would greatly increase throughput along the corridor and improve travel times for customers and commerce.

4. Alternatives Analysis

After analyzing the existing conditions of the corridor, the project team developed various roadway configuration alternatives and evaluated them against their examined ability to meet the long term needs of the corridor and address the priorities identified by the CPC. These alternatives ranged from reconstruct in-kind (no new capacity) to reconstruct with varying levels of capacity enhancement. Some of these alternatives include the addition of a "Flex Lane" that would allow the Tollway to manage the use of a widened inside shoulder to accommodate forecasted demand. Also, the analysis considered an alternative that contemplates exclusive managed lanes (Alternative 5) based on interest expressed by the CPC and other external stakeholders.

Figure 5: Typical Section, Flex Lane

[2] CDM Smith (2014). *Traffic Data Report for the Illinois Tollway System*

Further evaluation of all alternatives was conducted to assess the relative merits of each alternative against the CPC prioritized issues. Relative to the other alternatives, the criteria that form the basis of this evaluation include:

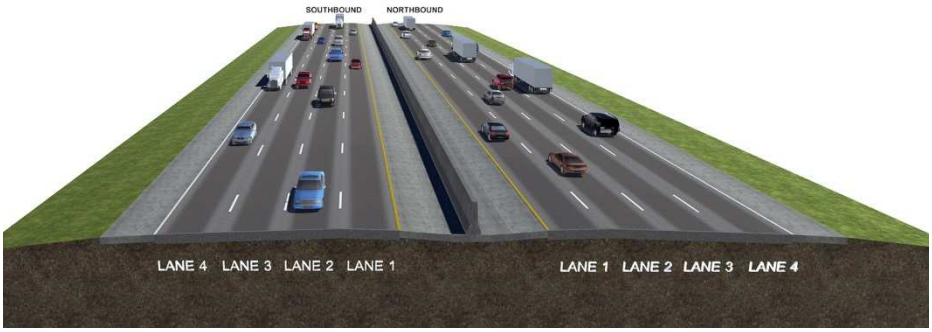
- **Congestion relief:** How does this alternative address current and future congestion levels?
- **Access improvement:** Does this alternative include opportunities to improve access to the corridor?
- **Minimization of environmental impacts:** What is the relative impact on parks? Wetlands? Air Quality?
- **Future flexibility:** Does this alternative allow for future conversion of shoulders and/or lanes to better manage traffic?
- **Opportunities for innovation:** Does the alternative provide the opportunity to implement technology and allow the Tollway to evolve and to consider *Smart Solutions* in the future.
- **Mitigation of flooding and drainage problems:** Does the alternative provide for regional detention improvements?
- **Improvement of freight mobility and safety:** How well does the alternative improve congestion and travel times for trucks?
- **Preliminary Cost Estimate**

Typical Section Alternatives: The initial phase of the Alternatives Analysis considered alternatives that proposed a uniform improvement throughout the entire length of the corridor (e.g., adding one general purpose lane throughout the full length of the corridor). This set of alternatives (Alternatives 1 through 5) is referred to as the "Typical Section Alternatives".

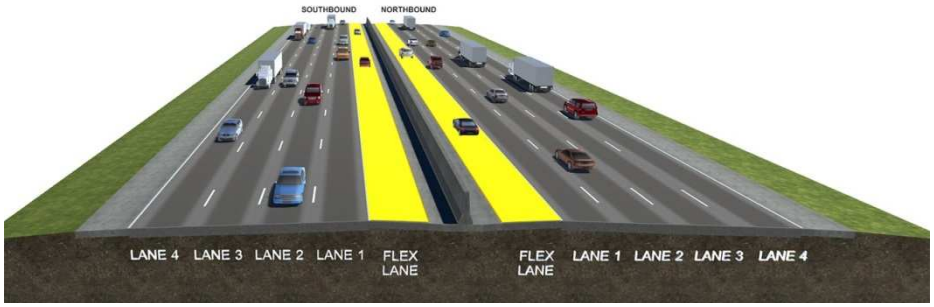
- Alternative 1: Baseline Reconstruction Alternative: No added capacity
- Alternative 2: Adds Flex Lane (wider inside shoulder) to the inside of Lane 1
- Alternative 3: Adds a fifth mainline lane on the outside (maintain standard median width)
- Alternative 4: Adds both a Flex Lane and a fifth mainline lane
- Alternative 5: Adds buffered managed lanes to the corridor

As congestion relief was identified as the highest priority by the CPC, vehicle throughput was used as the initial screening criteria to compare the effectiveness of the proposed improvement. Optimal throughput is achieved when traffic on a roadway is traveling within 10% to 20% of the posted speed limit in a steady flow, eliminating the stop and go conditions that lead to congestion, backups and incidents.[3] As the Typical Section Alternatives were analyzed, it became clear that a uniform improvement would not appropriately address the congestion needs of this corridor as the traffic demand greatly fluctuates along the corridor.

[3] TRB (2010). *HCM2010 Highway Capacity Manual*

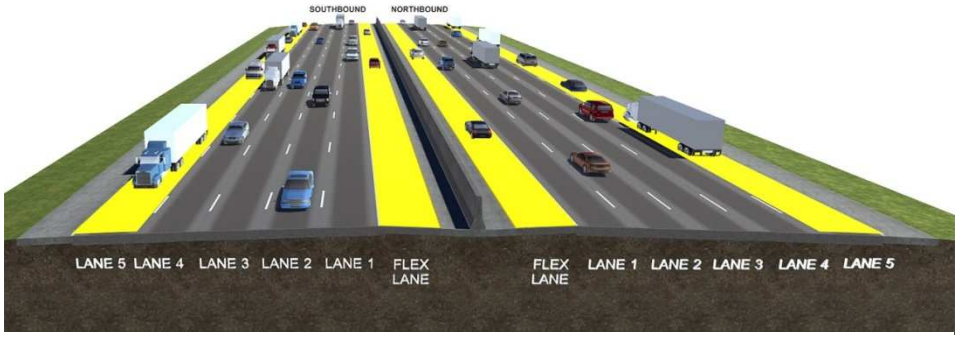


Alternative 1

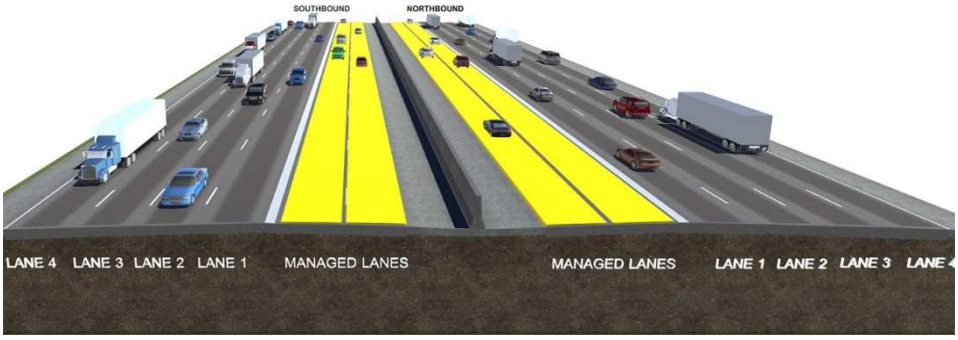


Alternative 2

Alternative 3



Alternative 4



Alternative 5

Figure 6: Typical Section Alternatives

Analysis of the Typical Section Alternatives resulted in the following conclusions:

- Alternative 1: This alternative did not meet the objectives of the study as it would not improve congestion conditions for customers. Existing traffic models show the roadway is currently over capacity and will continue to worsen given 2040 traffic projections if the CTST is not widened beyond its current footprint.
- Alternative 2: The result of the evaluation determined that simply adding a Flex Lane throughout the corridor would not alleviate the congestion and would possibly hinder some operations of the roadway. The analysis determined that in order to address congestion, the Flex Lane is needed for the morning, noon, and evening peak periods which equates to a continual 12-hour usage per day. When the Flex Lane is in use, the inside shoulder is not useable for emergency response, disabled vehicles, and roadway maintenance. Given the high traffic volume on the corridor and its local and regional importance, restricting the maintenance of the roadway by closing the inside shoulder for 12 hours a day and related emergency response impacts does not meet the objectives of the study.
- Alternative 3 and Alternative 4 were found to "overbuild" in some areas and "underbuild" in others along the corridor. The volume demand along the corridor varies from section to section. In some instances, the existing four lanes are capable of providing adequate capacity. In others, such as between interchanges, an extra lane or two are needed to maintain flow to eliminate queuing and congestion.
- Alternative 5: Although Alternative 5 adds capacity in the form of dual managed lanes, the likely intended use of a managed lane would not carry the same capacity as a general purpose lane and would prohibit use by freight traffic. For these reasons, Alternative 5 does not adequately address all capacity issues along the corridor, especially for freight traffic and those using the general purpose lanes.

None of the Typical Section Alternatives were found to be effective in providing optimal congestion relief along the corridor. It was determined that a uniform cross-section for the entire corridor did not generate the best value for the level of investment and was not further considered as a complete solution. As a result, an additional set of alternatives were developed that build upon the Typical Section Alternatives and are referred to as the Hybrid Alternatives.

Hybrid Alternatives: Because of the varying traffic volumes and spacing of interchanges, a group of alternatives were developed that would vary in cross section (number of lanes) adjusting to the traffic needs of a particular section. Starting with the base condition of five continual lanes throughout, the traffic model was used to determine where sections could be reduced to four lanes or should be increased to six lanes with additional auxiliary lanes placed in strategic places to provide proper lane balance between the interchanges. This resulted in a set of "hybrid" alternatives that would allow for a varying number of lanes depending on the capacity needs of a specific area. This set of alternatives (Alternatives 6 through 8) is referred to as the "Hybrid Section Alternatives" and is defined as follows:

- Alternative 6 provides the basic number of general purpose lanes to meet the projected 2040 traffic demand. This alternative allows the Illinois Tollway to add capacity to those locations where it is needed, and avoid overbuilding the roadway in other areas.
- Alternative 7 provides the basic number of lanes to meet the projected 2040 traffic demand but incorporates a Flex Lane as a capacity-bearing lane in lieu of a general purpose lane. In several locations, Alternative 7 provides one fewer general purpose lane in each direction than Alternative 6.
- Alternative 8 is similar to Alternative 6 in that it provides the basic number of general purpose lanes to meet the projected 2040 traffic demand; however, a Flex Lane would also be provided to give the Tollway flexibility for a variety of uses of the median lane, such as improved incident management or transit.

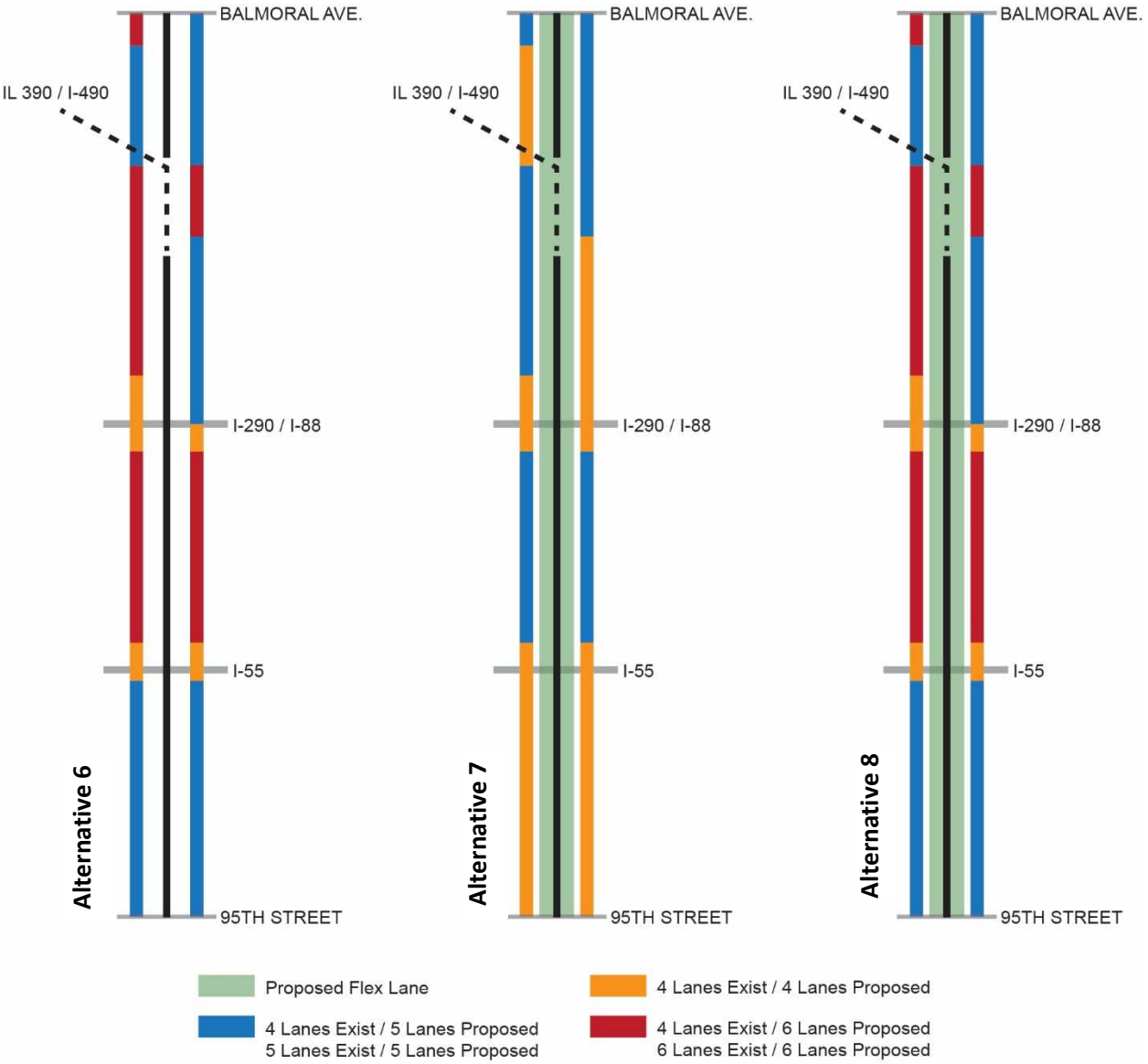


Figure 7: Hybrid Alternatives

This approach would attempt to right-size the facility balancing operational needs with budgetary constraints. The three hybrid alternatives were developed so that each have their own scheme for providing sufficient capacity – building only general purpose lanes to meet demand, building general purpose lanes and a Flex Lane that together would meet demand, or building enough general purpose lanes to meet demand and include a Flex Lane for added flexibility for a variety of uses in the future.

- Alternative 7 does not meet the capacity objectives of the study and the CPC as it requires near full-time use of the Flex Lane to meet the traffic demand and does not provide future flexibility in the use of the Flex Lane. As such, this Alternative was excluded from further consideration.
- While Alternatives 6 and 8 were both determined to meet the capacity objectives of the study, in context to broader regional transportation network goals, Alternative 8 was found to be the superior option. Both Alternatives 6 and 8 provide the additional capacity needed to meet future 2040 levels of demand. However, Alternative 8 offers a slightly wider cross section to accommodate the Flex Lane at a marginal increase in total construction cost and environmental impacts. Proposed improvement plans for I-290 and I-55, both of which are regionally significant connections along the CTST corridor, currently recommend managed lanes as a key improvement element. The proposed investment in managed lanes along these regional corridors is only made more valuable if the CTST corridor can provide a continuation of a managed lane option for travelers, an opportunity afforded by the inclusion of a Flex Lane. In the meantime, provision for the Flex Lane provides flexibility for a variety of applications such as a dedicated lane for transit or an opportunity to relieve back-ups during an incident.

	Initial Alternatives Considered						Finalist Alternatives	
CORRIDOR PLANNING COUNCIL GUIDING PRINCIPLES	Alt 1 - Reconstruction - No Widening	Alt 2 - Reconstruction + Flex Lane	Alt 3 - Reconstruction with Widening	Alt 4 - Reconstruction with Widening + Flex Lane	Alt 5 - Managed Lanes	Alt 7 - Hybrid with Add Lane (s). Flex Lane operates as General Purpose Lane	Alt 6 - Hybrid with Add Lane (s) without Flex Lane	**Alt 8 - Hybrid with Add Lane (s) and Flex Lane**
Provides Congestion Relief	●	◒	○	○	○	○	◒	◉
Improves Access	●	○	◒	◒	◉	◒	◒	◒
Minimizes Environmental Impacts	◉	◒	○	○	●	○	○	○
Provides Future Flexibility	●	◒	◒	◒	◒	◒	◒	◉
Supports Opportunity for Future Innovation	●	○	●	◒	◉	◒	●	◉
Fixes Flooding & Drainage Problems	●	◒	◒	◒	◒	◒	◒	◒
Improves Freight Mobility and Safety	●	◒	◒	◒	◒	◒	◒	◒
Initial Cost Estimate Midpoint of Expenditure **	$1.76 B	$4.04 B	$4.19 B	$4.40 B	$7.38 B	$4.39 B	$4.39 B	**$4.60 B**

Table 2 – Alternative Comparison

Relative Ratings				
Poor	Fair	Satisfactory	Very Good	Excellent
●	◒	○	◒	◉

** Costs developed for comparison purposes only.

Based on this assessment, Alternative 8 is the recommended option that best addresses the current and future needs of the corridor, its customers and is most responsive to the CPC priorities. This alternative was chosen as the baseline for the proposed improvements. Overall, Alternative 8 provides a forward thinking, long-term solution for the corridor. Relative ratings of each alternative in these categories are summarized in Table 2.

5. Recommended Alternative: Cost Estimate Refinement

The main objectives of the Recommended Alternative are to achieve state of good repair and to provide the additional capacity needed to address existing and future congestion. As new information about the condition of the existing pavement and structures became available, the scope and cost of major project elements were refined. Inspection and life cycle cost analyses identified assets where reconstruction was not needed, but instead recommended more cost efficient rehabilitation improvements. These refinements reduced the project cost estimate from $4.6B to $4.0B, while still achieving state of good repair and providing the same capacity enhancement and operational improvements as defined for Alternative 8.

Refinement of Alternative 8 included the following cost saving opportunities:

- Wolf Road to Balmoral Avenue: Widening and resurfacing the CTST in lieu of a full reconstruction can be implemented due to pavement condition. This pavement was reconstructed in 1992 as part of the *Four for the Future* program. This section is currently concrete and can be rehabilitated with pavement patches and overlaid with asphalt for up to three overlay cycles. Therefore, reconstruction may be provided in the future.
- Plaza 35 (Cermak Road): Minor pavement rehabilitation and median barrier replacement, as well as rehabilitation of Roosevelt Road Bridge can be implemented in lieu of a full reconstruction. This pavement was reconstructed in 2005 as part of the Open Road Tolling conversion.
- Plaza 36/39 (82nd / 83rd Street): Widening/resurfacing and median barrier replacement can be implemented in lieu of a full reconstruction. This pavement was reconstructed in 2005 as part of the Open Road Tolling conversion.

6. Recommended Alternative: Benefits Summary

The Recommended Alternative addresses the main concerns identified by the CPC and provides the most benefits to Tollway customers:

- Brings the CTST Corridor up to a state of good repair
- Utilizes general purpose lanes to solve the corridor's capacity issues
- Increases travel speeds during peak periods
- Increases the safety and reliability of the corridor
- Includes a Flex Lane to improve traffic operations and provides for a future transit option
- Includes a robust power and data backbone to support future technology
- Reconstructs for current and future travel needs

- Widens where needed to address needed capacity and eliminate chokepoints
- Reconfigures and improves I-290/I-294/I-88 Interchange to address bottleneck and congestion
- Adds new interchanges to improve local access
- Addresses local concerns regarding noise, aesthetics and quality of life where practical
- Allows for new truck parking and freight access opportunities
- Implements regional stormwater improvements

The CPC identified congestion relief as the most important issue for the Master Plan to address. The outreach for the project to local municipalities and Cook and DuPage Counties also resulted in a consistent message that congestion was a significant issue for the corridor. Relieving congestion on the CTST is good for the regional economy. Without improvements to this major north-south route, employment centers may become unreachable for individuals, and commodities would take longer to reach their destination. On a per mile basis, improvements to the CTST would have a bigger impact as they affect more Tollway customers than any other improvement the Tollway could make.

7. Recommended Alternative: Description of Major Project Elements

A budget estimate was prepared for the Recommended Alternative including the required work on the roadway, bridges, retaining walls, drainage, technology, right-of-way acquisition, utility relocations, lighting, and other infrastructure elements along the corridor. The total cost of the Recommended Alternative is estimated to be $4.0 billion (based on current cost escalated to the midpoint of construction expenditure) . Descriptions of the major project elements are described as follows.

Mainline - The scope of work for the Recommended Alternative includes reconstructing mainline pavement (except as noted in the *Cost Estimate Refinement* section), widening along congested sections, shifting the alignment at several locations to reduce impacts, correcting existing deficiencies where practical, and adding a widened inside shoulder to be used as a Flex Lane. The Flex Lane would allow the Tollway to adapt to future technologies and would provide options for active traffic management, congestion mitigation, and/or incorporation of future transit strategies. This work would also bring much of the corridor up to a design speed of 70 mph.

Additional lanes are proposed along several sections of the project in order to meet traffic demand for the future traffic projections (2040 design year). In general, the number of mainline lanes recommended for the project are shown in Figure 7. Additional auxiliary lanes would be provided where needed for proper operations at and between interchanges.

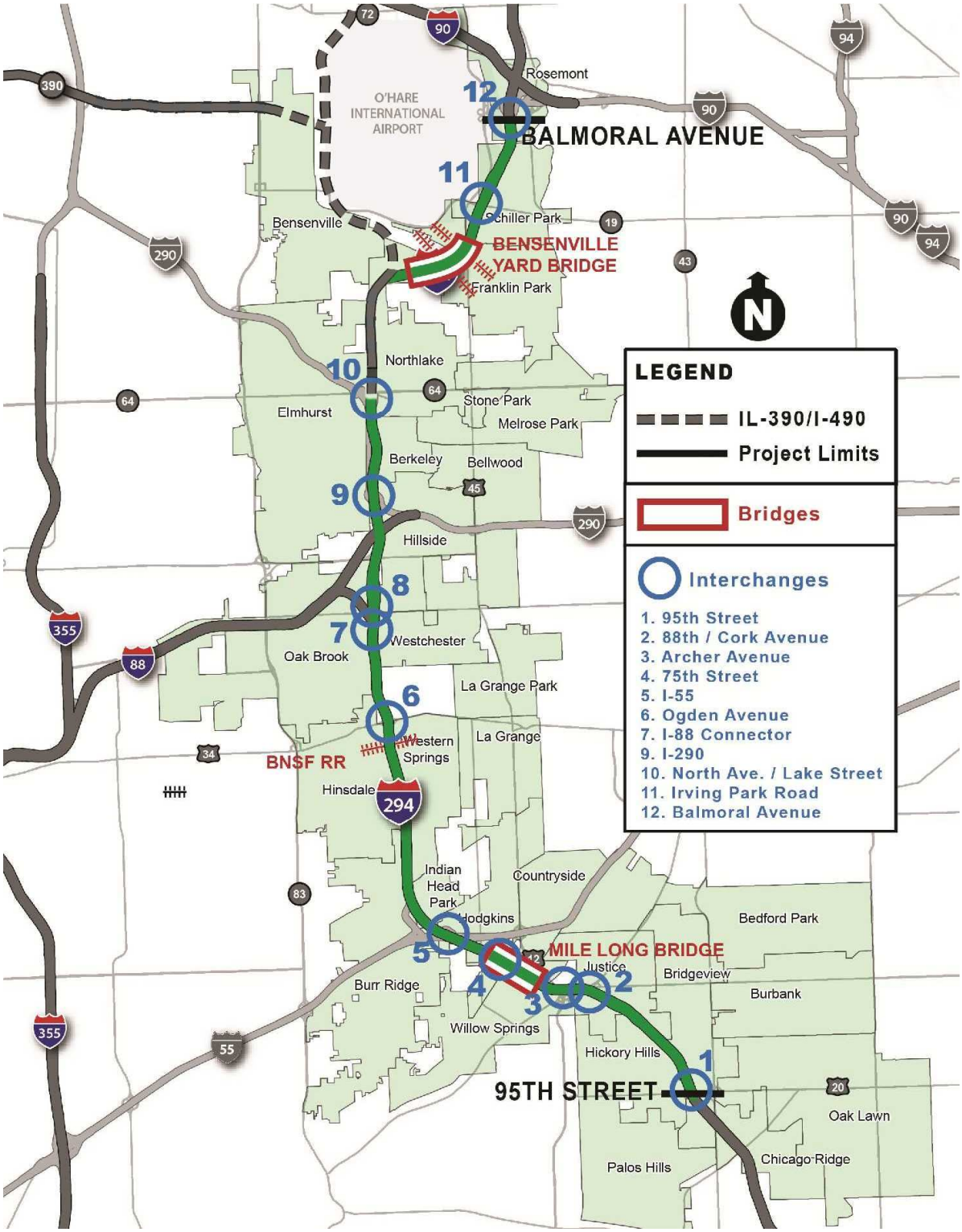


Figure 8: Interchanges and Bridges along CTST

Interchanges - The Recommended Alternative includes a series of interchange modifications that would help improve operations as well as accommodate a wider cross section.

- 95th Street: Minor ramp modifications are proposed and maintenance/restoration of the existing queue detection system on southbound I-294 between 87th Street and 95th Street to detect congestion at both the east and westbound 95th Street off ramps.
- 88th / Cork Ave: Since 2015, the Village of Justice has led a Phase I interchange study for a proposed new interchange at 88th / Cork Avenue. The study of the proposed interchange includes the addition of a northbound exit ramp from I-294 to 88th / Cork Avenue, a new southbound entrance ramp from 88th/Cork Avenue through the manual side of the 82nd Street Mainline Toll plaza, and arterial improvements to incorporate a future new northbound I-294 entrance ramp via southbound Archer Avenue. As a result of coordination between the Village of Justice and the Tollway during the Master Plan, Tollway's Recommended Alternative for the CTST would plan for the footprint of the Village's proposed interchange as it continues to progress into Design Phase and identifies funding for a local contribution. The Tollway's Recommended Alternative for CTST also includes the construction of the northbound I-294 entrance ramp from southbound Archer Avenue as part of the Tollway's capital program and commitment to the interchange project. The Village project would also allow the Tollway to remove the existing southbound and northbound Archer Avenue ramps to southbound I-294, as that traffic demand will now be incorporated at the southbound entrance ramp from 88th/Cork Avenue.
- Archer Avenue: In addition to the new northbound Archer Avenue ramp as part of the 88th /Cork Avenue interchange project, a new Collector-Distributor (C-D) road is proposed in the southbound direction to separate weaving movements associated with southbound cash paying traffic and the three consecutive entrance ramps at/for southbound Archer Avenue, northbound LaGrange Avenue (US 12/20/45, which also incorporates the southbound I-55 to southbound I-294 system interchange movement), and northbound Archer Avenue. Note that the Archer ramps may be removed once the Village of Justice project is complete. The northbound and southbound Archer Avenue bridges will be reconstructed due to their condition (original bridges) and to incorporate widening on the CTST.
- 75th Street: Partial interchange reconstruction is proposed to accommodate the shifted alignment of the new Mile Long Bridge.
- I-55 System Interchange: A new C-D road is proposed in the southbound direction from the Hinsdale Oasis to the I-55 exit ramp to reduce weaving movements and to separate slowing or queued traffic leading to the exit from the higher speed mainline traffic.
- Ogden Avenue: Rehabilitation of the existing full cloverleaf interchange to incorporate the widened mainline is proposed.
- An improved merge is proposed at the I-88 East-West Connector Ramp to southbound I-294. The southbound merge would be altered to make the entrance ramp a two-lane parallel entrance ramp that would form a 6-lane section south to I-55. Similarly at I-55, the northbound merge is currently a cause of significant congestion and is proposed as a two-lane parallel entrance ramp with a 6-lane section extending north to I-88.

- Cermak Road / Roosevelt Road: Minor ramp modifications are proposed.
- The North Avenue interchange would be reconstructed as part of delivery of the IL Route 390 / I-490 project.
- The existing Irving Park Road interchange would be rehabilitated to accommodate the widened mainline.

I-290 Interchange - The existing I-290/I-88 system interchange would be reconfigured in coordination with the Illinois Department of Transportation to eliminate congestion and to better improve connections between the three interstate highways.

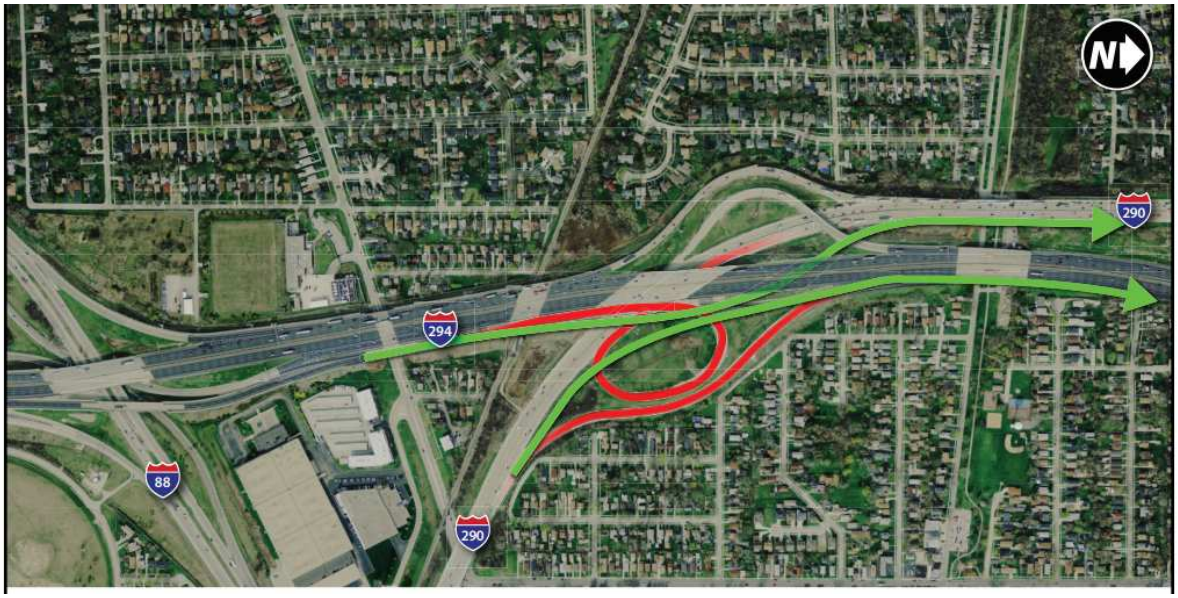


Figure 9: I-294 / I-290 / I-88 Interchange, Northbound Improvements

The northbound I-294 to westbound I-290 loop ramp would be replaced by a two-lane directional ramp that would cross over I-290 and then under I-294. The proposed configuration adds much needed capacity and increases the design speed. The I-290 westbound to I-294 northbound ramp would be re-aligned to increase the design speed, improve sight distance, and to provide space for stormwater detention. A slip ramp and C-D Road are proposed to St. Charles Road for I-290 westbound users.

The primary issue in the southbound direction is the weaving section between traffic moving from I-290 eastbound to I-294 southbound and traffic from I-294 southbound to I-88 westbound.

In the Recommended Alternative, each movement would be grade separated on dedicated ramps; therefore, all weaving sections would be eliminated. The existing exit-ramp from I-294 southbound to I-290 eastbound would be replaced with a two-lane ramp that diverges downstream to I-290 eastbound and I-88 westbound. The existing semi-directional off-ramp from I-290 eastbound would be replaced with a two-lane directional ramp that diverges downstream to I-294 southbound and I-88 westbound. Ramps to I-88 westbound would be barrier separated from the ramps to I-294 southbound in order to eliminate any weaving movement on the I-294 mainline.

Figure 10: I-294 / I-290 / I-88 Interchange, Southbound Improvements

Bridges and Structures – A total of 32 bridges would be rehabilitated, 7 bridges reconstructed, and 38 bridges would be replaced, including the Mile Long Bridge and the Burlington Northern Santa Fe (BNSF) crossing. Seven new bridges would be added and three structures would be removed (2 oases and 1 bridge).

Major concrete box culverts would be rehabilitated and extended or replaced as required. Retaining walls would be considered where requested by local communities and deemed more cost-effective than the purchase of right of way. More than 30,500 linear feet of new retaining wall is anticipated increasing the total length along the corridor to 86,000 LF.

The Master Plan evaluates the applicability of Accelerated Bridge Construction (ABC) techniques at each bridge structure to be reconstructed within the corridor. These ABC technologies could include prefabricated bridge elements and accelerated construction and installation methods.

Three bridges that are key to the project corridor are:

- Mile Long Bridge (milepost 20.7 to milepost 22.3)
- BNSF Bridge over I-294 (milepost 26.6)
- Bensenville Yard Bridge (milepost 36.9 to milepost 37.3)

Figure 11: Mile Long Bridge

Mile Long Bridge**:** The Mile Long Bridge is at the end of its useful service life and requires replacement. The current structure frequently requires repairs and patching disrupts customers. The recommended bridge type includes northbound and southbound structures crossing the Chicago Sanitary and Ship Canal, the CN railroad tracks, Metropolitan Water Reclamation District, Des Plaines River, I&M Canal, BNSF railroad facilities, and the 75th Street entrance and exit ramps.

The southbound structure will accommodate five traffic lanes plus a Flex Lane and shoulders. The northbound structure will accommodate five lanes of traffic plus a Flex Lane and shoulders; however, an auxiliary lane has been added to facilitate the 75th Street exit ramp. The proposed structure would feature non-parallel northbound and southbound bridges, with a varying open gap between them. The Recommended Alternative has geometry that includes the following features: the proposed southbound bridge overlaps the existing northbound bridge, horizontal alignment that shifts a maximum of 130 feet east of the existing Mile Long Bridge. The proposed structure provides a bridge pier layout that meets horizontal track clearance requirements and accommodates the current and future needs of BNSF and CN railroad operations. In its current configuration, the existing La Grange Road Bridge would be incompatible with the proposed changes to the Mile Long Bridge and CTST roadway cross section, alignment, and profile. Therefore, the La Grange Road Bridge and the Mile Long Bridge would need to be reconstructed concurrently.

BNSF Bridge over I-294**:** The recommended improvements to the BNSF Bridge over I-294 include a complete replacement of the existing structure. The existing roadway opening contains narrow shoulders which makes it difficult to safely perform maintenance on the CTST. Further, the existing structure has become functionally obsolete as the roadway opening does not accommodate the long term traffic demands and widened CTST roadway cross section. To address this concern, the bridge's horizontal deficiencies would be addressed by reconstructing the bridge with longer spans. The larger

span opening requires a deeper superstructure depth than existing and the railroad profile to be raised to accommodate the increased structure depth. The railroad profile raise would be maximized to provide an adequate CTST mainline opening without impacting the adjacent Highlands Metra Station or the Western Springs Metra Station.

Bensenville Yard Bridge**:** The proposed scope of improvements to the Bensenville Yard Bridge include bridge widening and rehabilitation. To accommodate an additional fifth mainline lane and a Flex Lane over the Bensenville Yard Bridges, both the northbound and southbound bridges require widening. In addition to widening, application of a bridge deck overlay, extending of the existing bridge parapets to a height of 42", new expansion joints, new approach and transition slabs, and concrete repairs to the existing substructure units are proposed. The recommended improvements would maintain the existing vertical clearance over Canadian Pacific Railway's Bensenville Yard, Metra, Franklin Avenue and Mannheim Road. Given the long lead time needed to coordinate these recommended improvements, discussions with Canadian Pacific Railway and other stakeholders should be initiated soon to advance these recommendations in earnest. The life cycle cost analysis indicated rehabilitation / widening of the structures was generally not cost effective to accommodate the widened mainline cross section. To date, no coordination has been initiated with the Canadian Pacific Railway.

Drainage - Drainage, storm water detention, and water quality were primary concerns of the communities along the corridor, as identified in the Corridor Planning Council's findings and recommendations. Existing storm sewer and drainage structures within the pavement reconstruction limits would be removed and replaced with new infrastructure designed to current Tollway Standards, and infrastructure within rehabilitated sections would be improved as required to address existing identified issues. Major cross culverts conveying Waters of the U.S. would be rehabilitated and extended or replaced. The recommended improvement would provide for the volume of detention of Tollway runoff that meets or exceeds current detention requirements. Infrastructure to improve water quality would be provided when possible. These improvements would help ensure that the Tollway is not adding to the region's stormwater issues. Regional opportunities to provide additional detention benefitting adjacent communities and the region are being considered beyond the Master Plan in conjunction with MWRD and local communities.

Toll Plazas – At the 82nd and 83rd Street Toll Plazas (Plazas 36 and 39), the proposed widening and Flex Lane would require reconstruction of the Open Road Tolling (ORT) monotube structures and associated toll collection equipment. Pavement widening, resurfacing and median barrier replacements are proposed in lieu of a full reconstruction. Minor pavement repairs are proposed for the unattended ramp plazas at 75th Street or the I-55/Joliet Road Toll Plazas (Plazas 34 and 37). Minor improvements are proposed at the Irving Park and Cermak Road Toll Plazas including median shoulder replacement to accommodate the Flex Lane. The recommended improvement does not preclude the conversion to All Electronic Tolling (AET) along the corridor should the Tollway decide to implement it in a subsequent program.

Oases – In order to accommodate the recommended widening, the over-the-road structures at the Hinsdale Oasis and the O'Hare Oasis would both be removed under the Recommended Alternative. The current span lengths at each Oasis are smaller than the width of the proposed roadway footprints. Both leases extend through 2027 but contain a provision for the Tollway to buy out the remaining years on the lease. Although the structures spanning the roadway would need to be removed, it appears feasible for the fuel stations to remain in some configuration to serve Tollway customers. Coordination with the adjacent municipalities on the future use of Oasis sites is anticipated to continue beyond the Master Plan.

Technology - Intelligent Transportation System (ITS) infrastructure including fiber, cable, conduits, gantries, and intermediate power distribution and communication (IPDC) units are proposed for inclusion. For the purposes of project costing, the Master Plan assumes gantries, or over-the-road sign structures, will be installed to allow the Tollway to communicate travel times, traffic incident information, lane closures and traffic pattern changes similar to the approach adopted along the Jane Addams (I-90). As experience with I-90 develops and as technology evolves in the coming years, the Tollway will bring greater definition to how ITS infrastructure will be placed into service. The goal of future investments in ITS along this corridor is to better position the Tollway to adopt innovative roadway operating and demand management strategies in the future. New LED roadway lighting would also be installed.

Right-of-Way – A cost analysis was performed to compare the cost of right-of-way acquisition against the cost of constructing retaining walls to avoid or minimize the needed right-of-way. Right-of-way needed for the project accounts for the widened pavement footprint, stormwater storage locations, and access at proposed retaining and/or noise abatement walls. Access consists of the area required for construction of the wall and an area along the wall for future Tollway maintenance and repair operations. If the project were to take a strict perspective of minimizing project costs, the Recommended Alternative could potentially impact approximately 430 parcels for permanent and temporary right-of-way and easements. However, understanding that cost alone is not a sufficient means to determine needed right-of-way, the level of impact will be refined as coordination with local stakeholders continues into design phase and as there is a better understanding of the local impacts.

8. Environmental Studies and Permitting

An Environmental Evaluation Document (EED) was prepared documenting detailed studies and the individual technical memoranda prepared for these resources. The following environmental resources in the CTST project corridor could potentially be impacted by the Recommended Alternative:

- Wetlands and Waters of the U.S. (WOUS) – Creeks, wetlands, and stormwater conveyance swales and/or unnamed tributaries occur throughout the project corridor. The Recommended Alternative is anticipated to impact 4.8 acres of USACE jurisdictional wetlands and 3.6 acres of USACE WOUS and 1.3 acres of isolated wetlands. A Joint Application form will be submitted to the USACE for project impacts within wetlands and WOUS in the design phase. Sites determined to be jurisdictional would require mitigation following the respective USACE or IDNR Interagency

Wetland Policy Act regulations and requirements. The Tollway is pursuing off-site mitigation for impacts to WOUS and wetlands in coordination with the Forest Preserve District of DuPage County, which includes the second phase of a water mitigation project along Spring Brook No. 1 within the Blackwell Forest Preserve. The Tollway is also considering additional wetland banking for mitigation of wetland impacts as well.

- Floodplains - Filling for roadway widening or other construction activities of the Recommended Alternative would impact floodplain and floodway resources associated with the Des Plaines River, Chicago Sanitary and Ship Canal, Salt Creek, Flagg Creek, Crystal Creek and Silver Creek. Coordination with the IDNR-Office of Water Resources (IDNR-OWR) would be required at these locations. Authorization would be required from the IDNR-OWR for encroachment on any public body of water with mapped floodway and floodplains. Impacts to streams, waterways, floodplains, and floodways would be mitigated in accordance with the requirements of the local, state and federal regulations.
- Solid Waste – The primarily urban development surrounding the I-294 corridor has high potential for the occurrence of adjacent properties to be impacted by hazardous materials and contaminants. The Phase I Environmental Site Assessment (ESA) revealed 79 Recognized Environmental Conditions (RECs)/Potentially Impacted Properties (PIPs) in connection with the recommended improvements.
- Noise – The project area along this section of the CTST provides a complex noise environment with respect to highway, rail traffic, air traffic, and industrial / non-industrial traffic noise. The project area includes nationally significant rail yards (BNSF, Canadian National and Union Pacific lines), and one of the busiest airports in the country (O'Hare International). In many locations, non-highway traffic noise produced the primary noise source, however, the model was constructed excluding non-highway traffic noise sources to identify the contribution from highway related traffic noise exclusively. Abatement measures were considered for all receptor locations that exceeded the Tollway's Noise Abatement Criteria (NAC). Approximately 5,300 linear feet of noise wall is being added increasing the total to 99,400 linear feet.
- Minimal or no impacts are anticipated to cultural and archaeological resources, threatened and endangered species, natural lands, public lands, and agricultural resources.

Several permits would be required for the project as mandated by federal, state, and local agencies. The Master Plan summarizes the permit, certifications and resource reviews that are expected to be required for the project based on the information available and the proposed improvements. Other permits may be required as the project design is refined and if impacts change.

9. Proposed Bid Packaging and Construction Schedule

For the purposes of implementation planning, a cash flow analysis was conducted to contemplate a potential approach to bid packaging and a potential construction schedule for the project. The following represents a conservative implementation schedule and is subject to change based on project readiness and funding availability. Three (3) Professional Services contracts along the corridor were already defined to help conduct the Master Plan:

- Contract RR-14-4221 – Mile Long Bridge [BN 191 & 192] which includes the mainline bridges over LaGrange Road [BN 183 & 184] (milepost 20.7 to milepost 22.3)
- Contract RR-14-4222 – BNSF Bridge over I-294 [BN 261] (milepost 26.6)
- Contract I-15-4656 – Elgin O'Hare Western Access, I-294 to I-90, Central Tri-State Tollway and Franklin/Green Street (milepost 33.5 to milepost 36.2)

The majority of the mainline CTST construction contracts could be scheduled commencing in 2022 with advanced work packages. The following advanced work is recommended to begin prior to mainline CTST work:

- Advance deck patching work, performed under contract RR-16-5714, began in 2017 to prepare for the staged traffic configuration that would be required for the Mile Long Bridge replacement.
- Advance retaining and noise abatement wall, building/structure demolition at the Hinsdale and O'Hare Oases, residential and commercial building demolition, advance MOT rehabilitation and crossovers installation, advance crossroad bridge structure work, and utility relocation contracts
- Overhead crossroad bridge structures are recommended to be completed in the years prior to the mainline CTST construction contracts when possible. Off-alignment structures and portions of ramps that are proposed at the I-294/I-88/I-290 interchange should also be constructed initially where impacts to the roadway network can be minimized.

Figure 12 – Potential CTST Construction Schedule

Construction of the mainline CTST improvements could commence in years 2024 through 2026. Nine (9) mainline design sections are recommended as a result of the Master Plan:

- 95th Street (milepost 17.8) to LaGrange Road (milepost 20.7).
- 75th Street (milepost 22.3) to I-55 Ramps (milepost 24.1).
- I-55 Ramps (milepost 24.1) to Ogden Avenue (milepost 27.8)
- Ogden Avenue (milepost 27.8) to I-88 E-W Connector (milepost 29.1)
- I-88 E-W Connector (milepost 29.1) to Roosevelt Road (milepost 30.5)

- Roosevelt Road (milepost 30.5) to St. Charles Road (milepost 32.3)
- St. Charles Road (milepost 32.3) to North Avenue / Lake Street (milepost 33.5)
- Wolf Road (milepost 36.2) to O'Hare Oasis (milepost 37.8)
- O'Hare Oasis (milepost 37.8) to Balmoral Avenue (milepost 40.0)

10. Maintenance of Traffic Concept

The Master Plan developed a traffic staging concept in which four (4) mainline travel lanes are maintained in each direction during construction in order to minimize disruption to Tollway customers. This concept utilizes both single lane and dual-lane counter-flow configurations and involves up to five stages of construction. While this will result in longer construction duration and a higher cost than maintaining three (3) mainline travel lanes, it will provide the Illinois Tollway and its customers with the most efficient traffic control plan allowing customers to maintain their current travel during construction. There are discreet locations within the corridor where the traffic volumes may allow a drop to three (3) lanes allowing improved constructability and decreased construction time. These locations will be studied in greater detail in the design phase. Trucks would be prohibited from use of the counterflow lanes, and shoulder rehabilitation would be required to accommodate stages where truck traffic would utilize the existing shoulder.

The corridor is divided up into various segments of independent utility with counterflow lane configurations are shown in Table 3. No counter flow lanes are proposed north of Wolf Road.

Table 3 – CTST Counterflow Lanes

			Counterflow Lanes	
From	**To**	**Milepost**	**Single**	**Dual**
95th Street	Plainfield Road	17.5 to 24.5		✓
Plainfield Road	Cermak Road	24.5 to 29.5	✓	
Cermak Road	St. Charles Road	29.5 to 32.3		✓
St. Charles Road	North Avenue	32.3 to 33.5		✓
North Avenue	Wolf Road	33.5 to 36.2		✓
Wolf Road	Balmoral Avenue	36.2 to 40.0		

In general, the stages begin construction on the eastern-most northbound lanes and progress west across the roadway. The proposed concept maintains four lanes of traffic in each direction, with the exception of a small area between the I-88 connector ramps where traffic volumes allow for the reduction in lanes. Currently, seven (7) Emergency Median Turnarounds (EMT) exist along the corridor. In stages where counterflow lanes are proposed, these EMTs would be temporarily closed off due to traffic being placed adjacent to the median barrier. Replacement locations would be further refined in the design phase of the project.

11. Utilities

Utilities can have a major influence on the schedule and costs of a project due to conflicts requiring relocations. Utility coordination started early in the master planning process and will need to continue as the design progresses in order to account for the number of utilities present. Currently, over 60 different utility owners are located within the corridor between 95th Street and Balmoral Avenue.

Major utilities that have been identified to have a major cost and/or schedule impact if deemed a potential conflict are:

- ComEd high-voltage transmission towers;
- several oil, gas, and jet fuel pipeline;
- large water feeder mains;
- large combined sewer mains;

If deemed a potential conflict, relocation of these items is anticipated to require several years of lead time due to the complexity involved with relocation. These major utilities, combined with the hundreds of fiber, electrical, cable, and telephone lines present in the corridor will make utility coordination a vital component of the overall construction project.

12. Agreements

Multiple existing Intergovernmental Agreements (IGAs) are in place within the corridor. The existing agreements are a mixture of local municipalities, IDOT, other agencies, and railroads and vary in purpose regarding utilities, construction costs and maintenance responsibilities. The Recommended Alternative would require multiple existing IGAs to be updated to reflect changes created by constructing the improvements. In addition to updating existing IGAs, the Tollway would need to enter into new IGAs for any proposed improvement not covered under existing IGAs such as:

- new underpass lighting / utility improvements
- aesthetic improvements
- drainage improvements
- right-of-way or easement transfers
- future maintenance of the elements
- cost sharing, if any

Coordination with these entities was initiated during the Master Plan process and will be required to continue during the next phase of the design process as details of the proposed improvements are more refined.

13. Outreach and Coordination

The project team engaged key project stakeholders and Tollway customers during the CTST planning process. In addition to the CPC meetings, direct engagement of local municipalities and agencies was initiated through two large stakeholder meetings. These meetings were held in November 2015 and

introduced the overall project and discussed regional issues. Additionally, one-on-one meetings with individual municipalities and agencies were conducted. The purpose of these one-on-one meetings was to gather information about how the corridor impacts residents, businesses, and Tollway customers; explore opportunities to streamline locally planned capital improvement projects with the Tollway's reconstruction project; and establish an ongoing dialogue. The outreach effort also extended to the general public. Three open house meetings were held in April 2017 to solicit input from the public about the proposed project expansion. To date, outreach efforts have helped to develop a plan that would address regional issues and have identified many opportunities for collaboration. Outreach is anticipated to continue with stakeholders throughout subsequent design phases to address local issues as more project details become available.

14. Design Deviations

Design deviations will be further investigated as part of the subsequent design phase.

15. Conclusion

The CTST is vital to Tollway operations. Therefore, it is recommended that the findings in this report be advanced to design contracts to more accurately evaluate deficiencies and improve performance of the existing system through the improvements detailed within the Recommended Alternative. This Master Plan document serves as guidance for future work throughout the CTST corridor and defines a Recommended Alternative that fits within currently available funding constraints. This allows the Tollway to adequately prepare for potential utility, environmental and right-of-way conflicts, and the execution of intergovernmental agreements.

In keeping with the *Move Illinois* Program vision, the CTST Project has the potential to deliver a comprehensive, regional solution offering congestion relief, improved access and enhanced mobility, while simultaneously providing the opportunity for partnerships with communities to address local needs and economic development. This new concept designed for the CTST meets today's transportation demands and provides flexibility necessary to accommodate evolving technology and to adapt to tomorrow's long-term needs. An investment in the CTST is an investment in the future that not only benefits Tollway customers, but also the region.